THE AMERICAN GAS LIGHT JOURNAL

REDMAN & KENNY, N.Y.

PUBLISHING OFFICE No. 42 PINE STREET

DEVOTED TO THE INTERESTS OF ILLUMINATION, HEATING, MECHANICAL, CHEMICAL AND GENERAL SCIENCE.

VOLUME LXXVI.—No. 25. Whole No. 1,411. | NEW YORK, MONDAY, JUNE 23, 1902. | $3 PER ANNUM, IN ADVANCE.

A. M. CALLENDER & CO., Proprietors. C. E. SANDERSON, Manager. THOMAS J. CUNNINGHAM and ELBERT P. CALLENDER, Editors.

ENTERED AT THE POST OFFICE AT NEW YORK, N. Y., AS SECOND-CLASS MATTER.

Published on each Monday of the year, at No. 42 Pine Street, New York.

Telephone.—2996 John.

Collections are invariably made directly from this office for subscriptions, advertisements, etc. We have agents to solicit the same, but they are not authorized to receipt for money.

Terms of Subscription, Including Postage.—For the United States and Canada, $3 per annum. European countries, $5 (£1—25 francs). All payments to be made in advance. Single copies, 10 cents.

Correspondence.—Wishing to make this JOURNAL a gazette of intelligen discussion to those of our readers who may wish to gain or give information on the subjects to which its columns are devoted, correspondence is solicited for publication from all who make the study of those subjects a pleasure or a profession.

The American News Company, Nos. 39 and 41 Chambers street, New York, are agents for this JOURNAL. Newsdealers will send orders to them.

Remittances should be made either by post office order, express money order, registered letter, or bank draft on New York, payable to the order of A. M. Callender & Co.

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The Public Lighting Tables of the American Meter Company will be found in the page advertisement of that Company.

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[OFFICIAL NOTICE.]

Tenth Annual Meeting of the Pacific Coast Gas Association.

PACIFIC COAST GAS ASSOCIATION,
OFFICE OF THE SECRETARY,
HAYWARD BUILDING, SAN FRANCISCO, CAL.

The Tenth Annual Meeting of the Pacific Coast Gas Association will be held in San Francisco, Cal., Tuesday, Wednesday and Thursday, July 15th, 16th and 17th, 1902. The meeting will be called to order in the Lecture Hall of the Pacific Gas Improvement Company, in their new building, No. 455 Sutter street. A reception room, reading room, and other conveniences will be provided for the use of members during the session. All books purchased during the past year by the Library Committee, and which form the nucleus of what bids fair to become a valuable library, will be placed at the disposal of the members for their use and inspection.

The following papers will be read:

President's Address, by Mr. C. E. Burrows, Walla Walla, Washington.

"Fuel Conditions in California," by Mr. John L. Howard, San Francisco, Cal.

"Gas Advertising," by Mr. R. P. Valentine, Sacramento, Cal.

"Municipal Ownership," by Mr. Frank J. Symmes, San Francisco, Cal.

"Differential Gas Rates," by Mr. M. C. Osborn, San Rafael, Cal.

"An Experiment on the Principles of Purification," by Mr. E. C. Jones, San Fransisco, Cal.

"Electrically Operated Appliances in Gas and Electric Works," by Mr. Geo. C. Holberton, Oakland, Cal.

"The Recognition of the Engineer, with Especial Reference to Gas Engineering," by Mr. L. P. Lowe, San Francisco, Cal.

A lecture will also be given by Mr. P. W. Tompkins, Analytical Chemist, of San Francisco, Cal., upon "The Methods of Determining Water and Sediment in Crude California Petroleum."

Wednesday evening, July 16th, at 7.30 o'clock, the usual annual banquet will be given, at which members only will be in attendance.

Thursday, July 17th, an outing will be arranged for the benefit of members and their families. A bay trip, to Vallejo and the United States Navy Yard at Mare Island, is contemplated, and it is hoped that satisfactory arrangements can be made whereby the privileges of the Yard will be extended to the Association. Few travelers to San Francisco are given the opportunity to visit the upper reaches of San Francisco and San Pablo bays, whose quiet waters are broken only by the picturesque Italian fishing smack, an occasional river steamer, or the characteristic homely, square-nosed scow schooner, which, heavily freighted, lazily drifts down the tide to the markets of the world, or plunges frantically in the sea when the cool, invigorating ocean breezes blow.

Monday evening, July 14th, there will be an informal meeting at headquarters.

Contributions to the "Wrinkle Department" should be sent to Editor Geo. S. Colquhoun, Fresno, Cal., without delay.

Those who have had experiences in the past year which might prove

LIBRARY OF CONGRESS JUN 23 1902 COPYRIGHT

of interest to members, are requested to send them to Mr. R. P. Valentine, of Sacramento, Cal., Editor of the "Experience Department."

The Question Box is a valuable feature of the meeting. It is desirable that all questions be forwarded to the Secretary as far in advance as possible in order to secure proper attention thereto.

J. B. GRIMWOOD,
Secretary.

[OFFICIAL NOTICE.]

Wrinkle Department, Pacific Coast Gas Association.

OFFICE OF EDITOR, WRINKLE DEPARTMENT,
PACIFIC COAST GAS ASSOCIATION,
1050 J STREET, FRESNO, CAL., May 14, 1902.

To the Members of the Pacific Coast Gas Association: As the Ninth Annual Meeting of the Pacific Coast Gas Association is drawing near, it behooves me, as the Editor of your Wrinkle Department, to remind you that it is time you were sending in your contributions to this department.

Wrinkles mean any small or large device, original in idea if possible, or anything that is not generally known to the gas fraternity, and that will in any way alleviate the trials and troubles of the gas man and promote his welfare and happiness, will be acceptable as a Wrinkle. If you will send in a sketch, photo or drawing, with explanation, it will be fully appreciated at our meeting this summer, as it depends entirely on the contributions, and following discussion of the members, to make these meetings successful.

Now, please, do not be backward, but send in all the Wrinkles you can gather up at once, and before you forget it. You may sign your name or not; just as you like. You surely have around your works, office, or main and service system a lot of original ideas that would be a benefit to some other member who is working under the same conditions.

Kindly make your contributions to this department at once, so as to enable me to get them in order before the meeting. Expecting an early reply, I am,

Yours truly,
GEORGE S. COLQUHOUN.

BRIEFLY TOLD.

VALUABLE ADDITIONS TO THE LIBRARY OF THE WESTERN GAS ASSOCIATION.—Mr. James W. Dunbar, Secretary of the Western Gas Association, recently informed the JOURNAL that Mr. J. B. Howard, of Galena, Ills., had made some valuable contributions to the Thompson Memorial Library of the Association, which collection is steadily growing in numbers and value. Perhaps "Uncle Jerry's" way of doing things in this respect will prompt others to follow his example. The collection donated by Mr. Howard numbered 15 volumes, and included the first three volumes of the AMERICAN GAS LIGHT JOURNAL, "Newbigging's Handbook," the "Treatise on Gas Works," by S. Hughes, Bowditch's "Discourse on Coal Gas," and the second and third editions of Clegg on "Coal Gas.' As a whole, the collection forms a most important addition to the Library, and its donor is to be heartily praised for his liberality and thoughtfulness.

NOTES.—The Consolidated Gas Company, of Baltimore, Md., has determined to issue $1,500,000 of certificates of indebtedness, to bear interest at the rate of 4½ per cent. per annum. The proceeds of the issue are to be devoted to paying for plant betterments now underway and contemplated.——The improvements on the works of the Lewistown (Pa.) Gas Company, planned by Mr. E. F. McCabe, General Manager of the Company, have just been completed. They include an additional purifier, 8 feet by 12 feet by 4 feet, connected to the old system by means of 8-inch, Beal, 4-way valves; a 5-foot station meter, and changing the connections from 6-inch to 8-inch pipes. New constructions for oil storage and alterations to buildings were also made. The iron work was furnished and erected by the Quintard Iron Works of this city. The Lewiston Company intends also to extend its mains, and is now in first class condition for the increased consumption that has already begun to record itself.——Mr. Wm. E. Hartman has accepted a responsible position with the City Gas Company, of Norfolk, Va.——It is understood that the transfer of the properties and franchises of the Jeffersonville (Ind.) Gas and Electric Light Company will not be formally completed until July 1st.

[OFFICIAL REPORT.—REVISED BY THE SECRETARY.—Continued from Page 882.]

PROCEEDINGS, TWENTY-FIFTH ANNUAL MEETING, WESTERN GAS ASSOCIATION.

HELD IN THE NEW ST. CHARLES HOTEL, NEW ORLEANS, LA., MAY 21, 22 AND 23, 1902.

SECOND DAY, MAY 22.

The session of the second day was called to order by the President at 10 A.M., May 22. The President called for the

REPORT OF COMMITTEE ON NEXT PLACE OF MEETING,

which was read as follows by Mr. F. R. Persons:

Mr. President and Gentlemen: The Committe on Next Place of Meeting unanimously select Indianapolis, Ind., as the next place for holding the convention.

Our second choice would be Cleveland, O. A telegram from Mr. A. H. Barret favors Indianapolis as next place of meeting.

F. R. PERSONS,
JAS. FORBES,
JAS. FERRIER,
} Committee.

The report of the committee was adopted. The President asked for the

REPORT OF COMMITTEE ON PRESIDENT'S ADDRESS.

Mr. E. G. Cowdery thereupon read the following:

Mr. President and Gentlemen: Your Committee most heartily indorse the address of your President as a whole, and in all its essential details.

It was most appropriate that the President should be of the South, in this, the first visit of the Association to this section, and he has most fittingly alluded to the wonderful efforts made in this city in the growth of the industry at this period.

We feel that some action should be taken by the Association as to the recommendation of your President to join with the American Association, or otherwise to take the necessary steps toward a proper representation of the industry at the Louisiana Purchase Exposition, to be held in St. Louis, in 1904. Respectfully presented,

E. G. COWDERY,
J. B. HOWARD,
GEO. F. GOODNOW,
} Committee.

On motion, the report was received and indorsed.

REPORT OF COMMITTEE ON OBITUARIES.

Mr. Paul Doty verbally reported on behalf of the Committee on Obituaries, and asked that sufficient time be granted the committee to prepare suitable minutes to the memories of deceased members, such minutes to be printed later on in the "Proceedings." Mr. Doty then read the following special tribute to the memory of Mr. Wm. Wallace Goodwin, which had been prepared by Mr. John Gribbel, of Philadelphia:

In Memory of William Wallace Goodwin.

The death of Wm. Wallace Goodwin closed a remarkable career. Born the son of a gas engineer, he exercised his inherited talent with energy, persistence, enterprise and intelligence rarely equalled. To him more than to any other American is due the development of the fuel uses of illuminating gas. When the subdivision of electrical energy made possible commercial incandescent electric lighting, Mr. Goodwin, with almost prophetic foresight, pointed out the possibilities of the gas fuel field. Like other pioneers, he was in advance of his fellows, but lived to see his prophecies fulfilled. He proved his faith by his works immediately by manufacturing gas stoves and energetically pushing their introduction. He it was also who first put into the hands of American gas men analytical and experimental apparatus of improved design and of American manufacture. His intelligent endeavor was manifest in every department of our industry. His enthusiasm was contagious. He broadened the outlook and lifted the ambitions of the gas men of the United States, and the result of his work is enduring. His generosity in thought, word and deed was as marked as his optimism and energy; and we pay tribute to his memory.

On motion the Committee on Obituaries was empowered to submit at a later time, for publication in the proceedings, suitable minutes respecting the deceased members, in accordance with the suggestion of Mr. Doty.

The President called for the

REPORT OF COMMITTEE ON PUBLICATION OF PROCEEDINGS,

which was read as follows by Mr. William McDonald:

NEW ORLEANS, LA., May 21st, 1902.

To the President and Members of the Western Gas Association: Your Committe on Publication of Proceedings reports as follows:

The Third Volume of the Proceedings of this Association was issued in April last. It contains the proceedings of the years 1887 to 1891, inclusive, and 450 copies were printed.

Your Committee proposes to embrace in the next volume the proceedings of the years 1899, 1900, 1901 and 1902, which will bring the published proceedings up to date, from and including the year 1887.

The Committee embraces this opportunity to thank the AMERICAN GAS LIGHT JOURNAL, who have extended every courtesy to the Committee in preparing the records of the meetings of this Association.

O. O. THWING,
WM. MCDONALD, } Committee.
JAS. W. DUNBAR,

On motion, the report was received and adopted, a hearty vote of thanks was tendered to Mr. O. O. Thwing, of St. Louis, for his persistent and successful work in connection with the collecting, editing and publishing of the proceedings, and the Committee was ordered continued.

Mr. Bankson Taylor, of New Orleans, La., read the following paper on

SOME EXPERIENCES IN NEW ORLEANS.

The title of this paper is "Some Experiences in New Orlerns," and when I come to consider the subject, it strikes me as one to which it will be very difficult to do justice.

The Company of which I am local manager took charge of the affairs of the resident Company, May 1, 1901, and we came here knowing nothing of the people, the manners and customs, and those various characteristics and peculiarities that go to render the life of one community distinct from that of others.

On May 1 we advertised extensively in the papers, taking an upper half page in every daily paper in the city, and we have continued this method of display advertising ever since. During the first 10 days we sold 1,200 gas stoves, and as we had only about 40 on hand, there was, of course, delay in installations. Rush orders were placed with the different gas stove manufactories, and stoves were hurried into the city as rapidly as possible. One concern which had hoped to take care of our entire needs, and which had guaranteed to send us two cars per week, found that this paltry amount was of but little value, and the President of the concern himself suggested that stoves be purchased elsewhere, as it was impossible for him to take care of us wholly.

We purchased 4,000 stoves from one concern alone, and we have today some 10,000 in use, as against the 250 installed in the city May 1, 1901. We purchased all kinds, wherever we could, and were glad to get them.

The installation of stoves necessitated the purchase also of large quantities of wrought iron pipe and of meters. I remember distinctly the first order that I placed, and in fact I think my first official duty was the ordering of 1,000 5-light meters. I thought this was a pretty large order, but since that was placed, between 8,000 and 9,000 meters have been purchased from this same concern.

Two problems confronted us—the getting of orders and the filling of same; and the latter seemed by far the most difficult.

During the month of May practically no increase was shown in our output. The 40 stoves which we had on hand commenced to go out at the rate of about 2 per day; but bear in mind that during this time we were receiving orders at the rate of over 100 per day. It was necessary, therefore, for us to reorganize our force. It is no easy thing to raise a department inside of a week or 10 days, from 3 men up to 250, utilizing the services of some 40 teams, yet this we did; and while unquestionably this resulted in a good deal of coarse work being done in the installation of stoves, yet, as I look back upon it, it seems to me wonderful that more mistakes were not made.

The first carload of stoves which was received was made the excuse of a parade of teams through the city, with banners and music, which display was extensively written up by the papers, and the somewhat original method of advertising favorably criticized.

While this was going on work was commenced upon the rearrangement of our office building, during which time it was necessary for us to place a desk out in the street, at which orders for sometimes 100 stoves a day were taken.

We had two gas works here then, one a coal gas plant, which it was thought advisable to shut down; and for this purpose we ran 1½ miles of 12-inch pipe, so that we are now supplying the entire city from one works.

At this time our output between 6 A.M. and 6 P.M. was about 60,000, as against 500,000 now. At present our day output runs about 50 per cent. of our total.

In the month of June the result of our efforts commenced to be shown, our increase over the corresponding period of last year amounting to 15 per cent., and this was the commencement of a series of constantly improving results which have brought satisfaction to the management and profit to the gentlemen who fathered the undertaking.

The changes in method and the increase in our business necessitated, of course, many changes and additions in the personnel. The office building being remodeled, the second floor was taken for the use of the various departments, and by October 1, next, the third floor, which is at present leased, will be utilized for this purpose, so that the entire building at the corner of Baronne and Common streets, one of the handsomest buildings of the city, upon one of the most prominent streets, will be devoted entirely to the business of the Company.

We found on coming here a coal gas plant in the old Jefferson City or Garden District of the city, which as stated above has been shut down. There was also downtown a water gas plant with a capacity, as stated by the superintendent, of 750,000 daily; with this apparatus we made during the past year 1,700,000 daily. We have installed an 11-foot Lowe machine, bringing our capacity up to over 3,000,000, and contracts have been made by our Chief Engineer for further apparatus of this type.

Those of you who visit our works while in this city will, I think, agree with me that, thanks to our able superintendent, they are in the pink of condition, and that much attention has been paid in our general scheme of improvement, to their beautification. Many changes, however, were necessary before we could turn our old slave quarters into a storehouse, and make our oil tank to blossom like the rose.

The New Orleans Gas Light Company was organized in the year 1835, and a part of the property where the works now are was the site of the original plant. We have torn down buildings, paved our yards, set out flowers and vines, and sodded our holder yard. We have put in a high pressnre system 12 miles in length, laid 40 miles of distributing system—thereby actually opening up for residence purposes many of the stre ts of our city—and we have run 1½ miles of 12-inch main so that we could shut down our Valence street works. Our office building has been improved, and the entire system of accounts and method of working in the office have been changed, and in the meantime the work of getting business and taking care of it has gone merrily on; so that at no time have we lost sight of what was our original thought in coming here—to satisfy the people of this community.

Our feeling has been that the affairs of a corporation such as the New Orleans Lighting Company must necessarily be matters of interest to the community, or at least we wish them so to be, and it has seemed to us that, not even in the offices of the various city officials should more frank and open conditions exist than in ours. To this end we have, at all times, taken the public into our confidence, and while not rushing into print at every opportunity we have, at the same time, kept the community advised as to our aims and our work, what we are doing and what we propose to do, until the public has come to appreciate the difficulties under which we labor, and to share in our satisfaction when they are overcome.

We have given away large sums, both in money and in material, to the various worthy charitable and religious institutions in the community, and we are daily in receipt of letters from the heads of these communities and organizations, expressing gratitude and their appreciation of our conduct. We have felt that so large an institution as ours, one of the largest if not the largest taxpayer in the community, should become a factor in the life of the city, and we have endeavored to see to it that at no time should the existence of the New Orleans Lighting Company be forgotten.

The management has made it a point from the very first to be absolutely accessible to the public, believing that the complainant is, after all, the best friend of the Company, in that he puts the Company in a position to improve conditions and correct existing evils. Our policy has been to handle complaints with special courtesy and attention. We have introduced a system of return postal cards so that the complainant can report back to the complaint clerk whether matters have or have not been arranged satisfactorily. This system has, I think, been of great benefit to us, as it conveys to the individual consumer a deep impression of our desire to satisfy him in every way.

Our experiences in New Orleans have been many and varied, and yet I know of none which has impressed me more deeply than my return to New Orleans a few weeks ago. I had been in New York and was sick there. As we crossed Lake Ponchartrain, over 6 miles of beautiful,

smooth water, and entered the Crescent City, I commenced to breathe as it did not seem to me I had breathed during my entire trip, and I thought then, more strongly than ever before, "New Orleans is a good town to live in, after all, and I should dislike to go away from it permanently."

As I said before, the old Company was incorporated in 1835, and I like to look over the ancient records and note the curious things that happened in the old days. In 1861 $56,000 was charged to profit and loss, owing to the advent of Butler and the liberation of the slaves then owned by the Company, and in looking back upon that time, one seems to hear the old bell at the gas works gate calling the darkies to their work at the little iron retorts.

What has become of "Isaac, No. 1," who used to run the old oscillating engine over in the holder yard; of "Ephraim," who fired the antiquated cylinder boiler, and of "Jim Harvey," who ran the grist mill and turned out the ground firebrick?

Did the superintendent consider the yield per pound in those days, and did the cost per 1,000 feet in the holder bother him much when they were getting $4.00 per 1,000?

Prominent men in our profession have been connected with the old New Orleans Gas Company, and as I look over the old archives I find a Theobald Forstall and a Walton Clark.

Hanging in my office is a plan of the Company's property, dated 1836, and signed by "Journot, Architect." The names of some of the streets even have been changed, and instead of St. Marc and Ste. Marie, we have now Magnolia and Robertson. It is entitled "Plant Belonging to the Gas Light and Banking Company, Together with the Buildings and Improvements Thereon," and opposite it on the mantlepiece is a bust of the gentleman who conceived the idea, and to whose work is due one of the earliest gas plants in this country. I refer to the first President, and one of the well-known and highly honored men in the New Orleans of the early days, Mr. James H. Caldwell. One of the ex-chief magistrates of this city, his portrait hangs to-day in the Mayor's parlor at the City Hall, and as Bank President, Mayor of the city, active citizen and philanthropist, his name has come down through the generations and his memory is preserved.

It is a grand old town and a good old Gas Company, and we who represent the latter, even while introducing modern methods, still endeavor to uphold the old tradition, and to maintain the standard of respectability and honesty handed down to us by our forbears.

Discussion.

The President—I think there was an implied promise, when it was decided that New Orleans was to be the place of meeting, that something novel would be presented in connection therewith, and Mr. Taylor's paper presents a picture of novelty certainly beyond anything that we have as yet listened to. The paper is now before you for your consideration, and I would ask Mr. J. B. Howard to lead the discussion.

Mr. Howard—The changes which have taken place in this city, as indicated by the able paper which has just been read by Mr. Bankson Taylor, are so marked that it is difficult to realize that they have taken place. I know myself something of the early history of this city, and of the condition of its works as they were more than 4 decades ago. It is now 42 years ago since I had an opportunity of learning by personal experience about gas in New Orleans. I came down to this city from the North in 1860 for the purpose of going into business here, and in accordance with the regulations of the Gas Company I was required to procure a license, and I have that valuable document in my pocket at this time. The permit bears the date of July 18th, 1860. The works at that time were very small, comparatively speaking. I have inspected them since reaching the city, and while the old cast iron retorts were in use in 1860, the magnitude of the present plant demonstrates the wonderful changes which have been wrought by the efficient management now in charge of the property. Referring to this delightful city, I desire to express my extreme pleasure in accepting the hospitality and courtesy of the kind friends who greeted me on my arrival in New Orleans. The hospitality of this city is proverbial, and one always feels while here that everyone is his friend. That is one of the attributes of the Southern people. I very highly appreciate the great improvements which have been made in the gas works of New Orleans, as outlined by Mr. Taylor in his paper, but these have been foreshadowed by the character of the management of the plant. With Mr. F. H. Shelton at the head of this great and growing institution, its constant expansion and continued prosperity were to have been expected, and each member of this convention feels proud of the fact that he is numbered among us, and that his efforts have been crowned with such marvellous success. I do not know that there is a similar case on record where so great a revolution in the business has been accomplished in so short a time. And the end is not yet. Changes and improvements are still continuing, and the works and processes are being carried to the highest state perfection. We rejoice in the progress that has been shown, and congratulate Mr. Shelton and his associates upon the results of their efforts.

The President—I wish to call your attention to a cook book that Mr. Persons just mentioned incidentally. I hope each member will get a copy. It is compiled by the New Orleans *Picayune* and contains the best receipts known in the South. It has many characteristically Southern receipts. The New Orleans Lighting Company extends it to all of you for such use as you can make of it. I will entertain a motion to present a vote of thanks to Mr. Taylor. [The vote of thanks was adopted.]

Mr. Shelton—I want to add a word as to Mr. Theobald Forstall, one of the gas engineers of the United States who in his lifetime permanently made his impression upon the gas business of this country. Mr. Forstall was in charge of the gas works about 35 years ago, before going from here to Chicago. He was one of the Presidents of the American Gas Light Association, and no man stood beyond him in the profession. We, to-day, in here looking over the New Orleans plant, have to thank him for the extended capabilities of which he foresaw the future; the symmetrical arrangement of the works, with each department well defined and separated from the other departments, and many other features that you will see when you visit the works this evening, with all their attendant antiquities and novelties.

LETTERS OF REGRET AND A TELEGRAM.

The Secretary reported that he had received letters regretting the inability of the writers to be present at the meeting from the following:

Barret, A. H.	Gimper, J.	McDonald, D.
Baehr, W. A.	Green, J.	Pratt, E. G.
Beal, W. R.	Harper, G. H.	Runner, Z. T. F.
Bodine, S. T.	Henry, W. G.	Stratton, S. S.
Clapp, G. N.	Littleton, A. W.	Slater, H. C.
Douglass, H. W.	Morrell, E. E.	Stedman, W. A.

The Secretary also read the following letter from Mr. A. H. Barret, First Vice-President of the Association:

LOUISVILLE GAS COMPANY,

LOUISVILLE, KY., May 19, 1902.

THOS. D. MILLER, ESQ., President, Western Gas Association, New St. Charles Hotel, New Orleans, La.:

Dear Sir—It is with great regret that I have to inform you of my inability to attend your meeting.

I am exceedingly busy, making several important changes and improvements, to which has been added additional work, in having one of our entire main pole lines completely demolished by a wind storm, together with the enforced absence of Mr. Snead, our President.

I trust that you will have a very successful meeting and that the boys may all have a good time. Please extend my kind regards to inquiring friends. Very truly, A. H. BARRET.

The Secretary read the following telegram sent from the Pacific Slope, by Mr. A. W. Littleton:

To Thos. D. Miller, President, Western Gas Association, New Orleans, La.—"I am about to open a bottle to drink to success of the Western's meeting.—A. W. Littleton."

ELECTION OF OFFICERS.

The President announced the next business in order was the election of officers for the ensuing year. The voting was by ballot, and the tellers (Messrs. J. T. Lynn and E. G. Cowdery) reported that the following officers had been chosen:

President.—Mr. A. H. Barret, Louisville, Ky.
First Vice-President.—Mr. F. H. Shelton, Phila., Pa.
Second Vice-President.—Mr. O. O. Thwing, St. Louis, Mo.
Secretary and Treasurer.—Mr. J. W. Dunbar, New Albany, Ind.
Editor Wrinkle Department.—Mr. W. E. Steinwedell, Belleville, Ills.
Directors.—Messrs. Jas. Somerville, Indianapolis, Ind.; Paul Doty, Detroit, Mich.; Robt. Young, Jr., Atlanta, Ga.; and Geo. E. Clarke, Kansas City, Mo.

ELECTION OF NEW MEMBERS.

The report of the Committee on Election of New Members, which was read by Mr. Wm. McDonald, recommended the placing of the following names on the rolls:

Active.

Berkley, Jos. M., Supt., Gas Co., Mobile, Ala.
Coughlin, P. M., Supt., Gas Co., Vicksburg, Miss.

Collins, Carroll, Supt., Gas Co., Austin, Tex.
Clarke, Geo. S., Supt., Gas Co., Kansas City, Mo.
Donahue, E. J., Gas Engineer, U. G. I. Co., Philadelphia, Pa.
Fisher, Jno. F., Supt., Gas Co., Baton Rouge, La.
Goodrich, J. W., with N. O. Lighting Co., New Orleans, La.
Goldsmith, M. L., with N. O. Lighting Co., New Orleans, La.
Gardner, W. H., Mgr., Gas Co., Valparaiso, Ind.
Gallagher, P. E., Mgr., Gas Co., Shreveport, La.
Horton, Thos. O., Mgr., New York and Richmond Gas Co., Stapleton, N. Y.
Haase, Emil, Supt., New Business, Milwaukee (Wis.) Gas Co.
Kersting, Albert T., Supt., Gas Co., Danville, Ky.
Luther, F. E., Supt., Ogden Gas Co., Chicago, Ills.
Mitchell, Geo. B., New Orleans Lighting Co., New Orleans, La.
Marshall, W. D., New Orleans Lighting Co., New Orleans, La.
McKee, J. M., Supt., Gas Co., Meridian, Miss.
Porton, J. P., Prest., Gas Co., Alton, Ills.
Rochat, Henry, New Orleans Lighting Co., New Orleans, La.
Shearn, John, Prest., Gas Co., Houston, Tex.
Speer, R. I., Mgr., Gas Co., Little Rock. Ark.
Simpson, C. O., Treas., Gas Co., Birmingham, Ala.
Travis, F. M., Treas., Gas Co., New Haven, Conn.
Walker, B. S., Mgr., Gas Co., Blue Island, Ills.
Wheeler, W. A. S., Mgr., Gas Co., Natchez, Miss.

Associate.

Day, Ernest D., M.E., New Orleans, La.
Gray, A. Ross, Agt., S. R. Dresser, Bradford, Pa.
Humphrey, A. H., Prest., Humphrey Lighting Co., Kalamazoo, Mich.
Martin, J. H., V. P., Am. Tank and Fixture Co., Chicago, Ills.
Marimon, Frank, Treas., Am. Tank and Fixture Co., Chicago, Ills.
Wray, E. W., Am. Tank and Fixture Co., Chicago, Ills.

Transfer from Associate to Active.

Gribbel, John, Philadelphia, Pa.
Lloyd, E. F., Detroit, Mich.

The ballot resulted in the election of the gentlemen named, whereupon the new members were introduced to the Association by Mr. J. B. Howard.

THE QUESTION BOX.

The Question Box was then opened and the queries were disposed of as follows:

Question No. 1.—"To what extent does the P. and A. tar extractor assist in causing the deposition of naphthaline, and what kind of an extractor would be recommended as a substitute?"

Discussion.

Mr. Norris—It is a well-known fact that hot tar absorbs hydrocarbons more readily than cold tar, and consequently if tar be removed from the gas before having had a chance to cool down, it will carry with it less hydrocarbons than if allowed to cool with the gas and come down in the condensers. If a P. and A. condenser be placed in its usual position, either immediately before or immediately after the exhauster, while the gas is still hot, it will remove a considerable proportion of the tar while the tar is hot. This tar would, therefore, remove from the gas less hydrocarbons than if the P. and A. had not been used, and the tar had gone forward to the condensers, and it had been there cooled before removal. In other words, if the tar be removed from the gas after cooling, this cold tar carries with it a certain amount of naphthaline and other hydrocarbons which are left in the gas when the P. and A. condenser is used and the tar is removed from the gas while hot.

Mr. Steinwedell—I think that the extent to which the P. and A. aids in the deposition of naphthaline depends on the location in which it is placed. Mr. Norris is perfectly correct in stating that cold tar obsorbs naphthaline and heavy hydrocarbons, but I think that to do away with the P. and A. causing the deposit of naphthaline it should be placed just where the gas has cooled sufficiently to have absorbed the surplus of the naphthaline, but before the tar has cooled enough to absorb the hydrocarbons. That will have to be found out by experiment depending upon the temperature of the retorts and the kind of coal you are using; but if the P. and A. is placed correctly, just after the absorption of the naphthaline, or has a properly constructed condenser before it, arranged for regulating the temperature of the gas, I think most of the trouble would be done away with.

Mr. Berkley—I would like to ask if there is any established rule by which you can determine the temperature at which gas should pass the P. and A. under the arguments just put forth?

Mr. Steinwedell—You cannot establish a certain temperature. That would have to be found out by experiment, but you can follow the temperature of the gas as it is passing the P. and A. and very quickly find out what your results would be. If in the first place you find that you are having naphthaline stoppages, it would be well to reduce the temperature of the gas passing through the P. and A. to a point sufficiently low, so that it would not affect the candle power of the gas, but would allow the tar to absorb the surplus naphthaline. When the candle power begins to drop it would indicate that the temperature at the P. and A. had reached a minimum, and show that the tar was absorbing both hydrocarbons and naphthaline.

Mr. Berkley—How can you control that? How will you raise or lower the temperature, according to the conditions of the candle power, if you were taking the gas direct from the exhauster to the P. and A. without first passing a condenser?

Mr. Steinwedell—Put the condenser in front of it.

Question No. 2.—"To what extent does escaping gas aid in the growth of shade trees? Is not a small amount beneficial instead of injurious to their growth?"

Mr. Egner—I think the less we say about that subject the better.

It was decided to discuss Questions Nos. 3, 4 and 5 jointly, in that they were corelated.

Question No. 3.—"What is the best expansion joint to be used on wrought iron pipe in which gas is delivered under high pressure?"

Question No. 4.—"Will wrought iron pipe laid serpentine-like permit and care for all ordinary expansion and contraction due to variation of temperature?"

Question No. 5.—"What is the best coating for wrought iron pipe used for high pressure distribution?"

Mr. Shelton—Wrought iron pipe will give good results, as should be expected, and in my experience it is not even necessary to lay it snake fashion. Ordinary expansion in iron pipe, like railroad tracks, will take care of itself, if the joints are sufficiently well made. I have laid miles of wrought iron pipe, using no special expansion joint, and had no trouble whatever. In crossing bridges, where the conditions are not ordinary, an expansion joint is desirable. I am free to say that I have used the Dresser joint and find it extremely satisfactory.

Mr. Steinwedell—I do not see how there could be much difference in the respect inquired about as to a high or a low pressure pipe. A very good coating called the "Cincinnati Mixture" was described in a recent issue of the American Gas Light Journal.

Question No. 6.—"What pipe best resists electrolysis; wrought or cast iron?"

The President—The little experience that we have had in Dallas was where we tap our our main on the top, using 2 T's, thus making a flexible joint. The current, discharging from the main to the rail, goes to the place of least resistance, and it finds it on this wrought iron pipe, because it is closer up to the rail, and so far as has been discovered no deterioration has occurred, except in the wrought iron pipes. We had trouble on Main street covering about 3,000 feet, and it had not been in the ground quite 3 years. I could not detect the slightest evidence, wherever I examined the main, of any deterioration in it. The idea that we may be charged with contributory negligence, because we have not protected our services, which has been advanced, I think is an absurd proposition, and to say that a company should uncover every joint of its pipe to see that it was electrically perfect in order to furnish a street car company an adequate return for ground currents, and all because the street car company desired to save expense in construction, is simply ridiculous.

Question No. 7.—"What grade of naphtha is best adapted as an absorbent of naphthaline, and where obtained?"

Mr. Norris—We have made experiments on this matter, but I do not recall them with sufficient accuracy to detail the facts.

Question No. 8.—"Is the continuous admittance of air to assist in revivification injurious to the purifiers?"

Mr. Doty—That is a very general question and difficult to answer offhand. The boxes will rust some perhaps because there is more or less air present.

Mr. Norris—I would say that while theoretically the presence of a slight excess of oxygen will result in a little rust inside the box, in our experience in purification with oxygen, an experience extending back some 10 or 15 years, we have never known the deterioration to be serious enough to be noticeable.

Mr. H. A. Carpenter, of Pittsburg, Pa., then read his paper on

GASHOLDER SPECIFICATIONS.

[For the text of Mr. Carpenter's paper see JOURNAL, May 26, p. 769.]

Discussion.

Mr. Shelton—I think there is no paper that will be of more practical value than this paper by Mr. Carpenter, if it leads to a good discussion of the points that the average gas man should look out for, in the construction of a gasholder. I speak from my own experience, and my own ignorance. I know very much less about the points that go to make up the right design, the right weights and the right details of a gasholder than I should, or than I wish I did. I think I can go further and say that gas superintendents on this side of the Atlantic, as a class, are less practically informed as to the proper details of holder work than they should be. They know more about these things in England than we do, and I think it would be a great step in the right direction were this Association to take some action leading to more knowledge of gasholder design or towards establishing a standard of gasholder construction; certainly, in many fundamental details, it would benefit the members, because some or most of us have to buy gasholders more or less blindly.

Mr. Egner—I would like to say that the German Association of Gas and Water Engineers, of whom you know, some two years ago appointed a committee with the object that you suggest, that of drawing up gasholder standards. I think the remarks of Mr. Shelton are well worthy of attention on that subject, and, if acted upon, will lead to such action as the German Association has taken in the matter.

Mr. Doty—I would like to ask Mr. Carpenter what difference in gauge he would recommend, with reference to the sizes and thicknesses of the plates, in the crown and side? If he would recommend 10 gauge for the side, would he recommend a heavier or lighter gauge for the crown?

The President—Mr. Carpenter will answer all those questions collectively at the last.

Mr. Norris—There is one practical point in regard to taking specifications just as they come from the makers of gasholders which I recently ran across. Where the makers of gasholders are asked to bid on a holder of a certain capacity, and no further specifications are given, there is a natural tendency on the part of the manufacturers to make the holder as light as is consistent with safety, in order to make the bid as low as possible. There is a marked tendency in modern gas practice to carry higher pressures on main systems, and where an endeavor is made to lighten up the holder to make it cheaper, we find very frequently that the inner section of such a holder is so light that it will not give us the maximum pressure which we wish to carry on our street mains; therefore, in asking for bids on holders, care should be taken to specify the pressure which we desire the holder to throw when uncupped. I have in mind the case of a holder that was being built for a gas company that we recently acquired. This holder, when uncupped, throws only 25-tenths, and the local conditions are such that we should have an available initial pressure of 40-tenths for supplying certain outlying districts; we are consequently obliged to use a fan booster when the holder uncups.

The President—Mr. McIlhenny, you have bought one or two gasholders in your time. What is your experience with them?

Mr. John D. McIlhenny—The last one I had anything to do with was about 3 years ago, when we bought a steel tank holder of 75,000 cubic feet capacity. We simply accepted the specifications of a reliable holder maker, and never had any trouble. We had neither the time nor the knowledge to dictate how it should be built. We simply took the precaution to have 8 columns placed on the outside, instead of the usual number of 6, which was to give it greater wind-resisting power. That's all the suggestion we made about it.

Mr. Egner—Excuse me for rising again. I want to mention a little experience of my own. Once upon a time I was making a trial at building gas works, and I gave it up after a year. During that time I was invited to bid on the construction of, I think, a 250,000 cubic foot gasholder. I made the drawings and specifications carefully and submitted my bid. I found out afterwards from the superintendent of the company, and also from the President, that my bid was the lowest; I was led to believe that all would be asked to bid on the same kind of material in that holder, to make it give a certain pressure; but after my bid was in, and while I was feeling impressed with the idea that I was going to get the job very likely, a firm (whom I shall not name at all, of course) who were higher in their bid than I was, asked to have another chance at it. They did get another chance, and they then made a bid about $1,200 lower than mine. I was then asked to revise my bid, but I didn't consider that I could make it any lower and give a good job, and so the construction company got the work. After that they were obliged to put in the weight of iron that I had calculated on, and they raised their price about $1,800 thus making it higher than my bid. Now if there were any standard for gasholders, as is proposed here to day, this thing could never have happened. It would be better for the gas companies and the contractors to have a standard. I think the contractors would benefit more than the gas companies if there were standard holders for different sizes, giving different weights.

The Chair—Mr. Goodnow, have you any suggestions to make looking to the taking of steps to secure standard specifications?

Mr. Goodnow—I have had occasion in the last two or three years to go over several holder specifications, and I think this suggestion is a most excellent one. There are probably many others who don't know any more about such things than I do, and as the only means I had of determining these points was by comparison between the different holder makers, perhaps not a very intelligent deduction was made by comparisons of different specifications for the same thing. I also had occasion this year to compare bids for holders of practically the same size with bids that had been submitted a year or two ago, and found, from the same makers, a substantial difference in the specifications for the same holder, apparently. I don't mean in price, but in thickness of plates, angle irons, guard frames, etc. Now, a staudard to go by would have been of great assistance to me, and I have no doubt to many others, and when the time comes to make a motion to that effect, I would like to move that a committee be appointed to devise some standard of measurements, especially for the smaller and medium-sized holders.

Mr. Cowdery—I second Mr. Goodnow's motion, that a committee be appointed by the Chair to do what can be done toward securing standard holder specifications, and to report to our next meeting the progress made during the year. I would also like to suggest in that connection that Mr. Baehr, superintendent of the works at Denver, is one of the best men in our Association to work up a matter of that kind.

[The motion was put and carried.]

The President—The Chair is glad to have that motion made, and feels that the appointment of such committee will lead to practical results. They need not go into the last details of the matter, but if they can only lay down fundamental specifications at that we would be far ahead of where we are now. The Chair will appoint the committee before the adjournment of the convention.

Mr. Carpenter—Mr. Egner's remarks and the question of the smaller mills being able to manufacture large plates of a suitable quality for the sides of steel tanks are extremely important points. Many times a small mill might accept an order for a bill of material in which the weight of the largest plates would run very close to the largest ingot that the mill could cast, and probably the top portion of that ingot would come in the end of your plate. At the very point where you should have the best of material you would get the poorest. The test specimens cut from the side of such a plate might show satisfactory results. This is why I say that test specimens, even though cut from every plate, may be entirely worthless. You should look further than test specimens if you would be sure of the material in large plates. As to what kind of paint to use, I have no idea of a compromise in the price of the paint. I do not believe it makes any difference if you pay 2 or 3 dollars a gallon, as long as you get something that will adhere to the steel plate and not flake off, as well as a paint that will stand working in water. Now red lead, or any paint mixed with linseed oil, will not fulfill the latter requirement, for the simple reason that linseed oil soaks up water. I am not prepared to tell you what kind of paint to use, except that it should be mixed with a non-porous material that will not absorb water. There are several kinds that might be tried. I understand that pure asphalt mixed with bisulphide of carbon is a very good paint. Then there are several paints undoubtedly made up of some mixture of carbon, possibly combined at very high or very low temperatures, that are apparently waterproof and stand working up and down in water very well. To my mind you ought to get that sort of a paint next to the metal of the holder. It would surely be of great benefit in building holders to get some standard specifications of the essential features and the limit of strains so as to eliminate that impetus to builders to cut weights in order to secure the contract. If you simply settle such matters on the basis of the lowest bid in dollars and cents you may be pretty sure that the tendency of the builders will be toward cutting the specifications. Answering Mr. Doty's question about gauges in the sides of the holder and in the crown. As far as the gauges in the side of the holder are concerned, it is largely a matter of getting enough metal there to stand the wear and tear and corrosion. The tension on the side sheets of the holder, unless it be very large

indeed, is within any ordinary gauge. In the crown it is a different matter; there the bursting strain to be taken care of is greater, varying comparatively as the diameter of the inner lift is to radius of the crown, and in heavy holders the crown usually requires a heavier gauge than the sides. Mr. Norris spoke of the pressure of the inner lift. As a general thing the correct design in construction of the inner lift of a small holder would give you a minimum of about 3½ inches. It does not pay to put metal in the inner section simply to secure an abnormally high pressure. Sometimes, even though the gas company has plenty of room to put in the most economical proportion of holder, yet requires a very high pressure on the inner lift. To put in the metal to secure this pressure is quite an expensive matter. It seems to me better to build the inner section right, letting the pressure come as it will, then if it is not sufficient for your distributing system secure whatever pressure is necessary by means of an exhauster or fan. As much force would be required to put the gas into a heavy inner section as would be expended in the other plan.

On motion of Mr. Howard a vote of thanks was tendered to Mr. Carpenter for his interesting and instructive paper.

The President introduced Mr. George F. Goodnow, of Waukegan, Ills., who read the following paper on

DISTRIBUTING GAS AT HIGH PRESSURE.

After reading a paper upon this subject before the youngest Gas Association in the country, the Wisconsin, and presenting another a week later before the mother of all Associations, the New England, at Boston, both in the month of February last, and listening to the objections, comments and questions which followed, as well as reading the correspondence which followed, from old Salem to new Seattle, the writer became convinced that there is a widespread interest among the gas fraternity regarding high pressure distribution. Using these objections, comments and questions as a text, something may follow which will possibly interest this Association.

Station Regulators.

Not much more than a generation ago the method of traveling was chiefly by stage coach, and the rate from 8 to 12 miles per hour. While no statistics are known to have been compiled, the writer ventures to say that the percentage of accidents of those travelling in this, the second year in the twentieth century, is less than it was then, when it is not uncommon to travel at a speed 6 times as fast as the stage coach ever moved, and I believe I have seen statistics which prove that it was safer to ride upon railroad trains than to walk or stay at home.

To-day steam is used at 4 times the pressure it was thought safe to use less than half a century ago. Fifteen years ago the legislature of Massachusetts passed an act forbidding the manufacture of gas containing more than 10 per cent. of carbonic oxide, because it was feared that the poisonous qualities of illuminating gas containing more than this amount would lead to innumerable accidents to those enjoying the benefits of this form of illumination; but, aside from the greater facility and completeness by those who wish to indulge in suicide, it does not appear that the percentage of deaths is materially increased because of genuine accidents caused by illuminating gas. But it is not necessary to enumerate to an intelligent body of men the steps that serve to lay off the milestones in the progress of the industries and the arts. Greater speeds, higher velocities, dangerous and explosive products and higher pressures have been discounted and overcome and guarded against by greater knowledge and higher efficiency of construction, supplemented by greater care in operating, in introducing safeguards, and we cease to think of these things and regard them as everyday matters and progress will continue.

Some timo last winter a disastrous explosion of gas occurred in Chicago, and the official report made to the Fire Marshal comments upon the fact that natural leakages are in all gas mains, varying from 10 to 25 per cent., but that no leak was found in the gas mains adjoining the buildings where the explosion occurred. The *Metal Worker*, of March 8, 1902, commenting on this report and the paper by the writer, read before the New England Association of Gas Engineers, in Boston, in February, says: "While it is improbable that any action will be taken by the authorities to force the companies to distribute their products through mains which will not from leakage make the opening of the streets a nuisance, the authorities can control the leakage, or insist that the gas shall not be distributed under heavy pressure. * * * As benefit appears to be derived from the new method of distributing gas, it is quite probable that high pressure gas distribution will be attempted in old mains, or that the same material that has heretofore been used in the low pressure mains will, in order to save the cost of the plant, be used in smaller mains and high pressure resorted to in order to supply the customer." Such a criticism of high pressure distribution needs no answer among gas engineers, as none of them would think of putting 30 pounds pressure inside a lead-jointed gas main, and the general public will not be alarmed unless serious accidents occur, and such we have no reason to fear from our experience.

The number of times safety seals have been blown has been so few that the working of the regulators can be considered almost perfect, and no visible injury has been done to a tin meter by pressure.

Our estimates of the carrying capacities of pipes of different sizes under these pressures have been too low, but such a mistake is not serious, and after the demonstrations afforded by nearly a dozen systems in successful operation, to call distributing at 10 to 30 pounds pressure a "Keeley motor scheme" is simply absurd. After even a brief acquaintance the system needs no defence, and the uses to which it may be adapted are just beginning to shape themselves. There are hundreds of localities which will be supplied in this way in the next few years, which could not be supplied in the old way. Besides our own plant which supplies a chain of 6 towns from one plant, and more may be added, there can be mentioned in Illinois the town of Sycamore supplied from DeKalb, which has been in operation 7 months, and 3 towns to be supplied from Aurora; also, a plant is now being constructed in Blue Island, Mr. B. S. Walters, Manager and Engineer, which will supply several towns and some suburban districts in the city of Chicago, and all the mains will be high pressure, even in the town where the works are situated, and each building will be governed by an individual regulator. A compressor, which will stop and start automatically by the rise and fall of the pressure in the pipe line, will be put in, and a method of measuring the gas, which promises to be much more accurate than a proportional meter, will be introduced. This method we are now testing in our own plant, and its simplicity and accuracy highly commend it. After we have used it another month we expect to be able to determine our leakage on the pipe line accurately.

In a great many gas towns the number of meters per mile of main will not exceed 50, and a good many localities in these towns will average[1] less than 50, and I think the average in the Central West would be less than in Massachusetts. Assuming this to be correct, a comparison of cost per mile of pipe of equal capacities, with low and high pressures, is interesting. A mile of 1¼-inch pipe, at 25 pounds initial pressure, will deliver as much gas as a 4-inch cast iron main at 25-tenths pressure, and a 2-inch pipe under similar conditions will deliver as much as a 6-inch. A computation shows that a 1¼-inch and a 4-inch, a mile long, will deliver under these conditions about 3,000 feet per hour, and a 2-inch and a 6-inch about 9,000 feet per hour.

With 50 services per mile the cost would be:

One Mile, 4-Inch Cast Pipe.

Pipe, laid	$2,112	
50 1¼ inch services	195	
50 cocks and boxes	55	$2,362

1. See Report, Board of Massachusetts Gas and Electric Light Commissioners, No. 17; January 1902, p. 186.

One Mile, 1¼-Inch High Pressure Pipe.

Pipe, laid	$792
50 regulators	300
50 ¾ cocks and boxes	50
50 lock cocks	25
50 ¾ services	150
	$1,317

In many cases 35 services per mile in a suburban territory would pay and the cost would be:

One, Mile 4-Inch Cast Pipe.

Pipe, laid	$2,112
35 1¼-inch services	137
35 cocks and boxes	39
	$2,288

One Mile High Pressure, 1¼-Inch Pipe.

Pipe, laid	$792
35 regulators and seals	210
35 ¾ cocks and boxes	35
35 lock cocks	18
35 ¾ services	105
	$1,160

I am familiar with some districts where 20 meters will average 1,000,000 feet per year, and such pipe would cost:

One Mile, 4-Inch Cast Pipe.

Pipe, laid	$2,112
20 1¼-inch services	78
20 cocks and boxes	22
	$2,212

One Mile, High Pressure, 1¼-Inch Pipe.

Pipe, laid	$792
20 regulators and seals	120
20 cocks and boxes	20
10 lock cocks	10
20 ¾ services	60
	$1,002

In exceptional cases, where a hotel or a club house and a few large country houses can be secured that would use 1,000,000 feet per year with 10 meters, the main would cost:

One Mile, 4-Inch Cast Pipe.

Pipe, laid	$2,112
10 1¼-inch services	39
10 cocks and boxes	11
	$2,162

One Mile, High Pressure, 1¼-Inch Pipe.

Pipe, laid	$792
10 regulators and seals	60
10 cocks and boxes	10
10 lock cocks	5
10 ¾-inch services	30
	$897

Such a comparison clearly shows the uses to which a high pressure system may be put. There is probably not a gas town of over 20,000 population where such conditions do not prevail in some of its territory, to say nothing of the utility of feeding dead ends and areas of poor pressure, with the aid of a few district regulators.

Every gas engineer, so far as I know, who has had any actual experience with high pressure, indorses the system. That it has its limits its friends do not doubt, but that it has its uses, and very many and varied uses, its friends do not doubt at all.

The installations in Pennsylvania and New Jersey, in operation and in prospect, I have no need to mention, as Mr. Shelton has made them well known to the gas fraternity. That there are several projected on the Pacific Coast I am assured by visits and correspondence from gas men from that region.

That it is now an important branch of gas engineering no one who has closely watched its development during the past three years doubts, and that it will increase in importance and gain further supporters is assured. The question of capacities of pipes does not worry the operators, as it has proven much more than was originally calculated.

The decreased candle power has not been visible to the seller of the gas, and, what is perhaps of more interest, has not been visible to the buyer, so far as he has expressed himself. That these questions will both be worked out and put in the form of mathematical formula and tables is only a question of time and opportunity; and the writer hopes to do his share.

Discussion.

The President—You have before you a paper upon another important subject before the gas engineers of to-day. I think Mr. Goodnow very comprehensively expressed the situation when he said that "Every gas engineer who has had any actual experience of high pressure indorses the system." Criticisms have chiefly come from those who placed themselves on record against it because they had no experience in the satisfaction and economies that come from it. It is now an important part of gas engineering. As Mr. Goodnow says, "It has come, and it has come to stay." We haven't much time to go into an extended discussion, for we have one or two papers more to consider before adjourning, but we don't want an important paper like this to go by without any discussion. Please try to confine it to the point.

Mr. Steinwedell—I had the pleasure of living in Highland Park, Ills., before the high pressure system was put in; and the people living in the Park (which is one of the suburbs of Chicago) were asking me from time to time whether they couldn't arrange for an isolated plant to feed their houses, so they could equip with gas. They wanted to put in acetylene gas, or any other kind that would serve them. At that time the houses were pretty well scattered, and while the territory was a good one, the people had large yards, and there was no feasible way of introducing the gas there, but since this high pressure came into vogue, all these people have been supplied. I think it would be a good thing for the companies, and I know it would be especially good for them in their service to the suburbs.

Mr. Berkley—I would like to ask what make of compressor does Mr. Goodnow use, that starts automatically and takes care of itself.

Mr. E. E. Eysenbach—The question of candle power need not bother anybody. The system of high pressure is feasible, but I think we will have some trouble in using high pressure with our present low pressure mains. I am afraid the leakage would be too high. I would like to know if anyone here has had any experience in introducing high pressure into an originally low pressure system?

The President—I don't think that anybody contemplates putting high pressure, of from 10 to 15 pounds into anything but new pipes, laid for that purpose. I would be very much opposed to turning in any such range of pressure into old pipes.

Mr. Ferrier—In computing the cost, Mr. Goodnow does not calculate the compressor. I would like to know something on that point.

The President—Mr. Forstall, have you any questions to ask?

Mr. W. Forstall—No, sir; this matter does not concern me at all. Our work is at low pressure. High pressure would cost us a good deal more than low pressure. However, I am very much interested in it, though I don't know anything about it, except what I have read.

The President—High pressure is something to fit particular cases and is not a medicine to cure all conditions. It is a very good thing, for instance, for reaching outlying districts, or connecting towns a few miles apart, where the object is to get rid of one plant. It is simply a question of local conditions, and in many cases is well worth adoption. Mr. Goodnow, I would ask you, unless there are further questions, to reply to the comments.

Mr. Goodnow—The question as to the compressor, I suppose, means just the absolute cost of the machine?

Mr. Ferrier—The machine and all.

Mr. Goodnow—Well, the figures in the paper are simply a comparison between a mile of one system and a mile of the other. The cost of a compressor that could handle 100,000 or 150,000 feet per day, with a duplicate set connected up, would be about $1,200. The machine we are using is not automatic, by-the-way, because this thing has been devised since that time. It is a Rand compressor. The one I had in mind, I know was made in Lorain, O., but its exact name I do not recall. The matter of putting in high pressure gas in low pressure mains, I mentioned in my paper, and I said that I didn't think anybody who was familiar with the subject would attempt to do that. The only attempts ever made were not to put the gas direct into the old, low pressure mains, but to feed from the outside, and using regulators to reduce it to approximately the same pressure that we were in the habit of carrying; say 3 inches or less. That is the only thing that should be contemplated, because it would certainly be inadvisable (not to use a harsher term) to try to put 5 or 10 pounds, or even 2 or 3 pounds, into a system originally designed only to carry 30-tenths as the extreme.

This matter of high pressure construction is something quite different, and opens up a field of gas engineering of which the details differ greatly from the old style of laying mains. I think that answers all the questions.

On motion of Mr. Egner a vote of thanks was tendered to Mr. Goodnow.

The President, in extending the vote of thanks said: Mr. Goodnow, we thank you heartily for your kindness in preparing this paper. To those who may want to dig into the subject further I would say that the future library index will point out where to get such data. In the last few years there have been 4 or 5, perhaps 6, papers on the question of high pressure before various Associations; and by looking up in the index one will find the journals containing the papers, and will be able to put one's finger right on the information.

ROLL CALL.

The Secretary called the roll, which showed the presence of the following members:

Honorary.

Harbison, J. P., Hartford, Conn.
Howard, J. B., Galena, Ills.
White, W. H., New York City.

Active.

Averill, G. M., Cedar Rapids, Ia.
Barthold, W. H., Grand Rapids, Mich.
Beardslee, C. S., Cleveland, O.
Bell, E. Wm., St. Louis, Mo.
Bowers, W. L., Davenport, Ia.
Chollar, B. E., St. Louis, Mo.
Cowdery, E. G., Milwaukee, Wis.
Cowdery, R. E., Topeka, Kas.
Dell, J., St. Louis, Mo.
Dickey, C. H., Baltimore, Md.
Doty, P., Detroit, Mich.
Dunbar, J. W., New Albany, Ind.
Egner, F., Morristown, N. J.
Eysenbach, E. E., Columbus, O.
Ferrier, J., Columbus, Ga.
Fitzgerald, J. H., Houston, Tex.
Forbes, J., Chattanooga, Tenn.
Gerould, C. L., Galesburg, Ills.
Goodnow, G. F., Waukegan, Ills.
Hyde, H. H., Racine, Wis.
Jenkins, E. H., San Antonio, Tex.
Kellogg, L. L , Sioux City, Ia.
Kincaid, H. E , Jackson, Tenn.
Leonard, W. H., Chicago, Ills.
Lynn, J. T., Detroit, Mich.
Mansur, J. H., Royersford, Pa.
McDonald, W., Albany, N. Y.
McIlhenny, J. D., Philadelphia, Pa.
Miller, T. D., Dallas, Tex.
Murdock, G. T., Elkhart, Ind.
Norris, R., Philadelphia, Pa.
Olds, G., St. Augustine, Fla.
Perkins, B. W., South Bend, Ind.
Powell, W. E., Logansport, Ind.
Quinn, A. K., Newport, R. I.
Roper, G. D., Rockford, Ills.
Shelton, F. H., Philadelphia, Pa.
Steinwedell, W., Quincy, Ills.
Steinwedell, W. E., Belleville, Ills.
Stevens, A. K., Washington, N. C.
Taylor, B., New Orleans, La.
Thwing, O. O., St. Louis, Mo.
Waring, G. H., Jr., Savannah, Ga.
Wheeler, F. B., Binghamton, N. Y.
Young, R., Jr., Atlanta, Ga.
Zeek, C. F., Pensacola, Fla.

Associate.

Barnes, G. W., Pittsburg, Pa.
Carpenter, H. A., Allegheny, Pa.
Collins, D. J., Philadelphia, Pa.
Eaton, A. B., Chicago, Ills.
Elliott, H. J., Chicago, Ills.
Gribbel, J. Philadelphia, Pa.
Guldlin, O. N., Fort Wayne, Ind.
Hayward, S. F., New York City.
Mueller, R., Decatur, Ills.
Parker, G. W., St. Louis, Mo.
Persons, F. R., Toledo, O.
Puffer, W. L., Chicago, Ills.
Steward, R. B., Chattanooga, Tenn.
Terhune, C. F., New York City.
Whirle, J. J., Detroit, Mich.
Wickham, L., St. Louis, Mo.

[To be Concluded.]

Some Consideration of Industrial Mergers.

[By Mr. Arthur E. Boardman.]

In the epidemic of mergers, combinations and consolidations which is sweeping over the country, nothing seems more natural and more promising than the merging of the gas and electric lighting industries in each locality; and it is not surprising to find many instances where such has been and is being attempted. The tendency in this direction is so strong, and the expectation of profits to be thereby realized so seductive, that a word of warning may not be inopportune.

While it may truthfully be said that no hard-and-fast rule can be laid down which will govern all cases, and that each locality presents a separate problem which must be solved with reference to its particular environment, still there are some general principles which should have powerful influence in deciding whether such a combination is wise or otherwise.

The consolidation of two or more separate industries is justifiable only when it accomplishes one, or both, of two purposes.

First, to put an end to *ruinous* competition; second, to accomplish economies in production and distribution which shall lower the cost *to the people*.

A combination which merely stops healthy competition, by taking possession of the entire field, defeats the real purpose of its formation, and should be avoided by the capitalist and discountenanced by the engineer. It becomes a monopoly in the most obnoxious sense, and invites the ill will and opposition of the people, without whose approval no public utility corporation can long exist.

A consolidation which effects economies in production and distribution and does not share the resulting profits with the people, does more harm than good and will ultimately come to grief. It diminishes the opportunities for profitable employment to the industrious, without lessening the cost of living for the many, and takes from labor and gives to capital an undue proportion of the profits.

A casual observer looks upon gas and electricity as occupying a common field and striving for the mastery in that field. The engineer recognizes the fact that the fields occupied by each are like eccentric circles, overlapping only in that portion of each devoted to the supply of artificial light; the overlapping area being great or small as the furnishing of light bears a large or small proportion to the entire business done. The competition in this portion of their respective fields is healthy and makes for mutual good to the two industries and to the public, up to the point where unfair or ruinous competition begins.

A combination which should put an end to this *healthy* competition is detrimental to the community and to the industries themselves. Each department should be encouraged to compete for business as strenuously as if under separate ownership, and be held in check only where such competition will entail a loss. Otherwise the industries will soon show symptoms of that "dry rot" so often observed in municipally owned works, where competition is forever impossible.

In such mergers as are under consideration the economies possible to be effected are not so great as are popularly supposed, or as may be figured out seductively on paper, hence it is not wise to capitalize the consolidation above a very reasonable and conservative amount. To do more is to make capital suspicious, the public angry, and to court disaster through inability to meet fixed charges promptly and make extensions and betterments where demanded.

If after mature consideration a proposed merger of gas and electric works on the above lines does not commend itself, the matter had better be dropped. If it can be entered into honestly for the purposes indicated, and without undue speculative inducement, it may be attempted. When it is decided to attempt it the work of the financier and engineer has but commenced.

The Nernst Lamp.

Electrical World reports that at the Cincinnati Electric Light Convention the Nernst Lamp was the subject of a topical discussion, partly through written communicatians and partly by discussion on the floor. A considerable portion of the remarks was contributed by central station men, having experience with the lamp, and the discussion thus forms one of much practical interest.

Mr. F. H. Golding, of Branford, Conn., reported that the results thus far from the use by his Company of the Nernst lamp have been very satisfactory. The customer is required to furnish the lamp and the station supplies renewals free of charge, as in the case of ordinary incandescent lamps. While he thinks the present price is rather high, yet, on the whole, he considers the lamp a commercial success. Mr. W. J. Greene, of Cedar Rapids, Ia., said 32 106-volt Nernst lamps placed in the office and dining room of a hotel have given splendid satisfaction so far as light is concerned. The life of the glowers, however, has been short, averaging less than 100 hours. A recording voltmeter shows an even regulation at proper e. m. f. Mr. Murdock, of Terre Haute, Ind., states that his Company had not gone into the Nernst lamp commercially, but have been burning one for 1,100 hours. It was found that as the candle power falls off the current falls off. At the start the lamp consumed 170 watts, and has been burning about 1,100 hours, consuming toward the end 140 watts. It is a 60-cycle, 208-volt lamp.

The Union Electric Light and Power Company, of Unionville, Conn., reported that it has installed 125 single-glower and 15 six-glower Nernst lamps on the street lighting service, these lamps covering all the street lighting that this Company does. From the standpoint of the public they are giving excellent satisfaction; the light is a pleasant one, and the fact that double candle power is given for practically the same price is of much satisfaction to the public. From the standpoint of the Company, there as yet is not sufficient data to judge of their commercial

success, as the lamps have been in use only about 5 months. It can be stated, however, that the Company considers there is no question about the matter, provided a steady voltage is maintained, it having been found that any very serious variations in voltage affect the life of the lamp. The lamps have not yet been run 800 hours, but it is judged that the average life will attain that figure. While the lamps deteriorate somewhat, the deterioration is not so noticeable as it is in an ordinary incandescent lamp.

Mr. J. M. Uptegraff, of the Sewickley (Pa.) Electric Company, reported that his Company is using Nernst lamps for street lighting, and is now installing the lamp for commercial and residence service, the customer buying the lamp and furnishing renewals. For street lighting the 6-glower lamp is used and gives entire satisfaction. The lamps have been in use since October, 1901. The glowers have given an average life of 1,300 hours. The lamps are inspected but twice a week —Wednesdays and Saturdays—and all burned-out glowers are renewed on these days. The street lamps are furnished and renewed by the lighting company. Mr. J. H. Perkins, of Youngstown, O., did not consider the Nernst lamp in its present shape and at its present price a commercial success. The reason given is that the Nernst lamp has been successfully developed to meet the conditions and standards for but a very few central stations, and if adopted in its present form it would cost a great deal for change of system on the part of an electric lighting company.

Mr. C. F. Nagle, of Savannah, Ga., reported that experience with the Nernst lamp had thus far been satisfactory to his Company and to most of its customers. It was found necessary to use care in supplying glowers of the proper voltage for the current furnished, as excessive voltage will soon destroy the glowers. With normal voltage some glowers will burn out within 100 hours, but if they burn for 100 hours long life seems to be assured. It was found that business can be secured with the Nernst lamp that could not be obtained with either the arc or incandescent, and that it competes successfully with the Welsbach. The cost per kilowatt for supplying current for Nernst lamps is greater than for incandescents, on account of interest and depreciation in addition to cost of renewals and care of lamps, and it has therefore been found necessary to charge a higher rate per kilowatt hour if the Company furnishes the lamps.

In the oral discussion. Mr. S. T. Dunham, of Hartford, Conn., said that his Company has had the Nernst lamp in use for 15 months, but principally for experimental purposes to determine its value. Not having any price for either glowers or lamps, it was not possible to determine the comparative economy of the lamp, but the conclusion has been arrived at that the Nernst lamp is closely related to the arc lamp in the matter of trimming. Every arc lamp is a new lamp every time you trim it; every Nernst is a new lamp every time you trim it, and requires also about the same care in repairing and cleaning, principally cleaning. The question which occurs to everybody is: How often can you afford to trim the lamp, and what will it cost as compared with the arc lamp? As regards the relation of the Nernst lamp to the incandescent lamp, the same socket can be used. That the Nernst lamp gives quality of light cannot be questioned. The light is soft, brilliant, but not too bright, and as compared with the Edison lamp it is a superior light. As to the power question, you make a great saving in the installation of machinery and in all the various line systems and underground work, by putting in half the current. Mr. Dunham said he expects to install this coming year about 5,000 Nernst lamps, which shows that he has confidence in them. It is a lamp of luxury, as the Edison lamp was within our recollection, when we paid 75 cents for a lamp, and which did not last very long, either; but the Nernst lamp will come within our reach as a bread and butter lamp more rapidly than the Edison, because it has severer competition. It must be put in such shape that it can be manufactured on a large scale, but you cannot reduce prices till you do manufacture on a large scale. The deterioration is less than with the Edison lamp. You get all the advantages of distribution in the Nernst lamp that you get in the Edison lamp, and which you cannot secure with the arc lamp. In conclusion Mr. Dunham said he considered that the lamp is certain to prove a success.

Mr. Frank S. Smith reported that the New York offices of his Company had used for the purpose of general illumination, 48 single glower, 3 three-glower and 6 six-glower Nernst lamps (a total of 93 glowers) on a circuit of nominal 216 volts, alternating current. Records show that at times the voltage has been as high as 242 and as low as 194, with a variation of approximately 8 per cent.; that is, 4 per cent. above and 4 per cent. below. The character of the light has been all that could be desired. Some little trouble was experienced in the cutout of the single glower lamps shortly after installation. These were repaired, and since then have operated entirely satisfactorily. In the 3-glower lamps a slight humming was noticed when first installed, but that was remedied and there has been no trouble since. Records of the number of glowers replaced were not kept previously to September 1st, 1901. From that date to April 18th, but 68 new glowers had been put in. In one instance, at least, in a single glower lamp, there has been but one replacement during the year; this was in a lamp that has operated satisfactorily since the beginning, burning an average of 4 hours per day, with the glower now apparently in good condition. The care of the lamps has been intrusted to a boy about 16 years old, whose duties have been to light the lamps in the morning and make replacements of burned out glowers. It is interesting to note that apparently the best service is received from lamps with more than one glower.

As stated above, shortly after the lamps were installed, in May, 1901, some few mechanical defects were noted. It was not surprising that a few defects should be noted in these earlier lamps, as this might naturally be expected while the lamp was in a more or less experimental stage. These troubles have, however, been satisfactorily remedied, and the lamps have, without exception, operated perfectly satisfactorily ever since. As to what is claimed to be the high price of Nernst lamps this is natural in view of the presumably large expense involved in the experimentation necessary to bring the lamp to its present successful form. It would be natural to expect, now that the preliminary work is practically over, that the price of lamps will be reduced, so that there can be no reasonable ground for criticism on this score from now on. In conclusion Mr. Smith said that his experience with the Nernst lamp has been such as to demonstrate that in its present shape it is a commercial success. As to the extent to which the lamps are being used, he said that he had observed them in a great many places, and the replies to inquiries us to their successful operation have always been in the affirmative. The matter of renewals is a very simple one, which any intelligent office boy can successfully carry out.

Mr. E. F. Phillips, of Detroit, Mich., contributed a lengthy written communication on the subject. His Company, he said, had felt the necessity for some time for a lamp to fill the gap between the ordinary cluster and the 500-watt inclosed arc lamp. In quite a number of places the cluster would not give sufficient light, while the 500-watt lamp would give more light than was really necessary; and in other cases 1 arc lamp would not give sufficient light and 2 lamps too much; besides, the cost of current to the customer in both cases would be more than circumstances would warrant. The 350-watt inclosed arc lamp was tried, but with indifferent success, there being little difference in consumption of current between it and the 500 watt lamp, and also much less power of illumination. The Nernst lamp, therefore, appeared to them to meet the conditions above noted, and also to open a field for use of current, which the Company could not otherwise obtain. It would be a strong competitor of the Welsbach light and of the Humphrey gas arc. Another consideration was that it would serve as an educator in the use of electric lighting with but small expense to the customer. In one instance a Nernst lamp in a store was using Welsbach burners; after the lamp had been used a little over a month the customer wired his store for 11 inclosed arc lamps and about 50 incandescent lamps, abandoning entirely the use of gas. In another case a Humphrey gas arc was displaced by a Nernst lamp to the complete satisfaction of the customer, both as to quality of light and cost

Following are some observations as to the renewals of glowers and general behavior of the few Nernst lamps Mr. Phillips' Company has put in regular service:

Lamp No. 1: Three-glower, installed February 1st; March, all glowers changed on account of burning dim. Current consumed February 1st to April 23d, 117.2 kilowatt hours; cost to consumer, $7.55 net.

Lamp No. 2: Three-glower, installed January 29th. Current consumed January 29th to April 23d, 51.2 kilowatt hours; cost to consumer, $4.77 net. This lamp was burning well May 1st, with no change of glowers, and with apparently small decrease in illumination.

Lamp No. 3: Six-glower, installed January 6th, at a sub-station to burn all night, every night. This lamp was equipped with a small inclosing globe and shade. January 16th one glower burned out and globe badly blackened. January 23d, two glowers burned out. February 28th, put in new set of glowers. May 6th, one glower burned out. Current used January 6th to May 6th, 297.5 kilowatt hours, with four glower renewals, or one glower to each 74.3 kilowatt hours, or 1,486 fifty watt lamp hours.

Lamp No. 4: Six glower, installed March 4th. April 8th, one glower burned out. Current used March 4th to May 6th, 155 kilowatt hours, or one glower for 77.5 kilowatt hours, or 1,550 fifty watt hours.

Lamp No. 5: Three glowers installed February 25th. No renewals. Taken out, and customer installed 11 inclosed arc lamps.

Lamp No. 6: Three glowers installed February 26th. March 19th, one glower burned out. Current used February 26th to April 23d, 27.1 kilowatt hours at cost to customer of $3.20 net. One glower for 540 fifty watt lamp hours.

Lamp No. 7: Three glowers, installed March 21st. May 7th, one glower burned out. Current used, 26.5 kilowatt hours, or one glower renewal for 530 fifty watt lamp hours.

Mr. Phillips says he has not been advised as to the price the manufacturers intend charging for new glowers, but figuring on a basis in comparison with lamp renewals at half a cent per kilowatt hour, in the cases noted, the cost for renewals would be as follows:

Lamp No. 1	117.2	kilowatt hours	$.536	3	glowers.
" 2	51.2	" "	.256	0	"
" 3	297.5	" "	.487	4	"
" 4	155.0	" "	.775	2	"
" 6	27.1	" "	.135	1	"
" 7	26 5	" "	.132	1	"
Total	674.5	" "	$3.371	11	"

or an average of $0.306 per glower.

No record has been kept of inspection, or time consumed thereon, it being more the purpose to observe the working efficiency and adaptability of the lamp to commercial service than to obtain an elaborate record of costs. The conditions observed were that there is a tendency on the part of the glowers to warp, thus bringing them so far away from the heater as to make the lamp very slow in starting up; the shortest time noted being 30 seconds and the longest 3 minutes.

There has been only one complaint of light becoming dim, and this was only proven when the old glowers and holder were substituted for new ones. It is not thought that this dimming is attributable to the black deposit on the holder, but is due to some defect in the glower itself, as new glowers have been put in partly blackened holders with appreciable difference in the light. Where warped glowers have been found it has been possible to correct the lighting up by turning them partly over, or bending up the terminals so as to bring the glowers closer to the heater. There has not been any trouble yet from the giving out of the steady resistance, or heaters. In conclusion, Mr. Phillips stated that to his mind much the most important obstacle to be overcome is the prevention of the warping of the glowers, for on this depends the satisfactory operation of the lamp. First, because a glower that is warped will not light up quickly, and will consequently cause complaint from the customer. Second, tardy lighting throws the heater into action for a longer period, and therefore necessitates its more frequent renewals. If this condition is remedied and no further defects are found in their operation—which from the limited experience are not looked for—and the cost of glower renewals is not excessive, Mr. Phillips feels sure that, owing to the fact before noted—that there is a field for it—the lamp should come into quite general use.

At the conclusion of the reading of communications and the oral discussion, Mr. A. T. Wurts made a lengthy communication to the subject. Referring to the citation of a life of 1,300 hours, he said that the frequency in this case was 125. As to the remark that if a glower survived 100 hours it would have a long life, it was explained that one of the chief causes of early breakage is mechanical strain on the glower. A glower expands and contracts particularly at times of lighting and turning off. The glower should be perfectly free and have an end play of about $\frac{1}{16}$ of an inch, when no mechanical strain will be brought on the glower, and the average life, barring a defective glower or accident, should be 800 hours on 60 cycles. With reference to frequency, the life of the glower is 800 hours on 60 cycles, and 400 hours, apparently, on 25 cycles. There are experiments being carried on in Buffalo on the circuit from Niagara Falls, which indicate a considerably longer life than 400 hours, but these experiments have not been completed, and nothing definite can be said at this time. The figure of 400 hours is based on results obtained from about 350 six-glower lamps which are operated in the factory of the Westinghouse Company on 25 cycles. On 133 cycles the life seems to be about 1,200 hours. As to the cost of trimming, there is as yet little data. The Westinghouse Machine Company has a large number of 6-glower lamps in the factory, and has kept a record of the labor required to take care of the lamps. The figures indicate that it requires a one-man-hour for 800 lamp-hours on the 6-glower lamp.

As to the direct current lamp the Europeans have labored along the lines of a direct current lamp exclusively. They have not made the alternating current lamp, so that the direct current lamp is not only a possibility, but a fact. In this country it has been found that the life of the glower on the alternating current is much greater than with direct current. The Nernst Lamp Company, however, is now making direct current glowers and proposes to put them on the market very shortly—probably by the 1st of September. An interesting feature in connection with this subject is that all lamps will be exactly the same, whether for direct current or alternating current, except the glower. The direct current glower will be different from the alternating current glower, and the same remark applies to lamps for different voltages. As an illustration, the 6-glower lamp for 220 volts is adjusted for 200, 230, 240, or whatever it is, and the lamps are the same in every respect except the glower.

As to the position which the lamp must occupy, so far lamps have only been made which will operate in a downward, vertical position. The reason for that is the cut out, which operates by gravity. For any special cases the position of the cut out could be reversed in the lamp, and in that case the lamp would operate in an upward vertical position; it has been considered, however, that the light should be thrown downward instead of upward and no steps have been taken to make a lamp which will operate in any other position than the downward. An endeavor has been made to produce a "universal lamp" which will operate in any position, but that will require something in the nature of a spring for a cut out, and it has been found that a spring is not always reliable.

As to the useful life of the glowers, possibly that is a good deal a matter of opinion. The total life of the glower seems to be about 800 hours on 60 cycles. Whether that would be considered the useful life or not, must be determined by the user. Nevertheless, even at the end of 800 hours, the glower still has an efficiency which will compete with other lamps now in use. As to the range of voltage, there appears to be a misunderstanding with regard to the Nernst lamp being very sensitive to changes in voltage. This idea has arisen from the fact, very largely, that in every case the Company asks for the accurate average voltage of the circuit upon which the lamp is to be operated, the object being that it could supply a lamp for the best possible satisfaction. In a great many cases where an incandescent lamp is bought and placed on the circuit, and not much attention given to the question of voltage, the life of the lamp is curtailed, but nothing is thought of this and the lamp is replaced; but the Nernst lamp, being new, the customer watches it critically to see whether it lives up to the claims made for it by the manufacturer. As a result, it is thought wise to request reasonably accurate figures with regard to voltage, so that the lamps can be adjusted at the factory for that particular voltage. A large correspondence, extending over 6 months, has shown that very few central station people realize what a very great change there is in candle power for a very small change in the line voltage. There is a drop of 40 per cent. in candle power in an incandescent lamp for a drop of 5 per cent. in voltage. That being the case, it is very important to have the correct voltage if the new lamp is to make a good impression.

The variation of candle power on the Nernst lamp, going upward, however, is exceedingly small, compared with the variation of the incandescent lamp. The variation in candle power for a 5 per cent. rise in voltage is only 12 per cent. in the Nernst lamp. The effect of an increased voltage on the Nernst lamp has been about as follows: Five per cent. rise for some hours does not seem to materially affect the life of the glower, but a 5 per cent. increase in voltage running continuously, would make a little difference in the life of the glower. A 10 per cent. rise running continuously will blacken the ballast tube. A 15 per cent. rise will make the ballast tube very black and a 20 per cent. rise will sufficiently heat the ballast tube to soften the containing glass bottle; thus by inspection of the lamp one is able to determine pretty closely how the lamp has been treated. But in the light of his experience with the lamp, Mr. Wurts feels it is impossible, on account of the very high corrective power in the ballast, to burn out a glower within 200 hours with a rise, say, of 10 or 15 per cent. The ballast goes first, but not unless the voltage is raised about 15 per cent. and run continuously at that increase. Mr. Wurts said he is very confident that if a glower gives out in less than 200 hours, the breakage is due to mechanical strain.

In reply to a question Mr. Wurts said the efficiency question is a difficult one to answer satisfactorily. He considers that the efficiency of the lamp should be based on its earning capacity. The lamps have been given merely a nominal rating. The 1-glower is called a 50-candle power lamp, which figure was arrived at by measuring the candle power on the photometer bar in the direction of greatest intensity, and the 1-glower lamp gives 50-candle power in this direction of greatest intensity with a clear glass globe. The Company has, however, devised

for itself a photometer. In its exhibition room is a ceiling cluster of 4 1-glower lamps with the sand-glass globes, and in 4 corners of the ceiling there are 4 clusters of 3 lamps each, of incandescent lamps, clear glass globes, making 12 16-candle power incandescent lamps altogether; it is the opinion of everyone who has been in the room that there is a great deal more light, better illumination, from the 4 1-glower Nernst lamps than the 12 16-candle power incandescent lamps. Most people say offhand that twice as much light is given out by the Nernst lamps, but a very conservative figure would be that the Nernst lamps are giving ⅓ more light. The 4 single-glower lamps take 352 watts. The candle power is measured by the 12 16-candle power units in the ceiling, all of which have reflectors over them. That is to say, the 16-candle power incandescent lamps are taken as the standard, and with that data and the power supplied to the Nernst lamps the efficiency of the Nernst lamp is estimated to approximate 1½ watts per candle.

The efficiency could be made a little higher or a little lower, according to the manner in which it might be considered. Taking the 6 glower lamp, for instance, which is a large unit, in most cases it is desirable to throw the light down; it has been found that the mean spherical candle power of the 6 glower lamp, from a 30° zone, is 1 watt per candle, and from a 60° zone about 1.23 watts per candle.

Protection of Long Distance Transmission Lines.[1]

By Mr. Charles H. Baker, Snoqualmie Falls Power Co., Seattle, Wash.

The chief weakness in a transmission project is the transmission line itself. Although every precaution has been taken, and no expense spared in constructing well this artery between the generating point and the consumer, yet nearly all our troubles have centered here.

We do not think a transmission system can be entirely reliable without a double circuit. Our present system transmits from the generating point at 30,000 volts by two circuits, each to Seattle, and two circuits each to Tacoma. These circuits parallel each other for 20 miles, and at the 20-mile point they are interchangeable through a high-tension plug-board system. For this distance we therefore have more assurance of continuity of service than from this point to the terminals where only two circuits cover.

It is our purpose later on, and we think it a good plan, to put in a plug board at one or two other intermediate points, in order to be able further to divide or interchange the circuits. If there is a break on any circuit, it can by means of these plug boards be located on a parallel short division and the circuit in trouble can be cut out and repaired.

It has been our practice to repair a circuit in trouble while current was running on the other circuit on the same sets of poles. An operation of this sort, however, must be undertaken by only skilful and cool headed men. Our wires are spaced 30 inches apart in the triangle.

About every fifth pole has a spare cross arm tacked upon it, and every half mile there is a spare pole resting on skids. The location of these spare cross arms and poles is known by the number of the pole at which they are located, and the patrolmen have a record of these, so that if there is any trouble the know at once where to go for relief mateiral.

Every three miles on our transmission we have a telephone booth located, which is commodious enough to contain also a few insulators, pins, wire, etc. The patrolman in making his rounds enters the booth and reports by telephone his presence there to the head works office at Snoqualmie Falls, and he also registers his call in the booth, so that his visits may be tallied at any time by the general superintendent or inspector. He reports the line "O. K." when he gets to the booth if such be the case. The length of the section in charge of each of our patrolmen varies with the character of the country and the difficulty of travveling it, but in general one man has about 20 miles in charge and patrols it twice a week. After having made a tour of inspection the patrolman mails a report card to the Seattle office, certifying the condition of the line.

Built as our line is, and inspected as rigidly as it is, we have eliminated entirely all troubles due to falling trees, running fires or wind storms. In fact, our troubles narrow down entirely to those due to interference evidenced either by malicious persons or boys shooting off insulators or throwing wires over the transmission lines. The only remedy for this is to make an example of a guilty party, and the experience of other transmission concerns has shown that such an example puts a quietus on the interference. We have had a law enacted in the legislature of this State, making any such interference a penitentiary offense, but thus far we have been unable to convict anyone.

As soon as a short circuit occurs, the lines are tested out immediately, to find out on what section the trouble lies. The trouble is invariably on one circuit only, so that the entire load is immediately placed upon the other circuit pending the correction of the trouble. As soon as the trouble is located on a division, the patrolmen from each end of that division start towards each other in great haste to reach it and repair it.

Our apparatus is protected by lightning arresters installed on the main circuits at the primary station and each of the sub-stations. We have very little lightning in this country and only once, I believe, in three years, have these arresters actually been called to duty, and on this occasion they worked to perfection. All our circuits are fused at the different stations for 100 per cent. overload, so that in case of a dangerous short circuit coming in, the fuses open up and the apparatus is cut out.

As an improvement upon our own practice, and to make the protection of any long-distance system further assured, I would suggest that the triangle of wires be constructed so that the apex insulator will be below instead of above, for the reason that a wire—or anything thrown over the lines—will be less likely, under such an arrangement, to cross two wires. In our system the apex is above. I would further suggest that the spacing in the triangle be greater for the same purpose, even though the inductive drop is thereby increased somewhat. Spacing should be at least 36 inches.

The insulator is the strong or weak point in a transmission system, and I am glad to say that we have been very successful, using the porcelain imperial insulators, of the best quality. I would suggest, however, that the insulators receive a brown glaze instead of the white (as in our case) as they will thus present a poorer target for anyone aiming at them. We have had a great many insulators broken to the extent of the petticoats being shattered off, but the wire almost invariably remains upon the core of the insulator. This would not be true in the case of a glass insulator, which would be shattered to pieces, allowing the wire to come down upon the cross arm.

I would suggest, further, that the telephone system be maintained upon a separate set of poles, as trouble on the transmission line is very sure to put the telephone out of service if both are on the same poles. These suggestions we would certainly inaugurate in any new lines that we are to build. As it is, any interruptions we have, and they have now been reduced to a minimum, seldom last over three to six minutes, which is just long enough to test out the line and switch the load on to the circuit which is intact. The location of with repair of the break, of course, takes longer, depending upon the distance the patrolmen have to go to reach it, but the repair of this, as stated above, does not interfere with the service.

1. *Engineering News* prints to the following abstract of a joint paper on this subject, read by the named authors at the Cincinnati Convention of the National Electric Light Association.

By Mr. L. Denis, Quebec, Canada.

The Quebec Jacques-Cartier Electric Co. has thus far had little experience with lightning trouble. Our transmission line consists of two 3-phase 23,000-volt lines, some 18 miles in length, and in several places passing in the neighborhood of tall trees. It is protected at both ends, at the very points where the wires enter buildings, with sets of Wurts lightning arresters arranged in the standard Westinghouse fashion. These arresters are our only protection against lightning. Although they have been noticed to spark occasionally, we have never experienced more than the result of a partial short circuit from the discharge. We seem to have had more trouble from gradual discharges, and from induced charges that take effect on the low tension side of our station transformers. On one occasion, one of these charges caused quite an amount of damage on the 2,000-volt switchboard, arcing to the ground from terminals leading to current transformers. In this case, as in others of the same nature, but less serious, apparently no damage was done to our station transformers. This locality has quite a reputation for the severity of its lightning storms.

By Mr. P. N. Nunn, Provo, Utah.

We have, at our several stations in Colorado, Utah and Montana, a number of lightning-arrester installations. These installations are all of the Wurts type of non-arcing arrester, and consist of a number of paths to ground, with a number of choke-coils between the line and apparatus to be protected. The exact arrangements employed are various and for voltage ranging from 4,000 to 60,000 volts, the higher vol-

tage being, in general, from star-connected transformers with neutral point grounded.

In all of these various installations an attempt has been made to improve upon the previous practice, and, in general, this has been successful. We have never had a serious disaster caused by lightning, or by the violent oscillations caused by the opening and closing of long power lines of large capacity and at a very high potential.

We have, however, had numerous small annoyances caused by lightning and the oscillations above referred to, and for this reason do not regard our present lightning protection as entirely satisfactory. We are now experimenting with the more recent type of arrester installation, including shunting and series resistance and fewer paths to ground.

By Mr. HENRY J. GILLE, St. Paul, Minn.

The St. Croix Power Co. is operating a 25,000-volt transmission line approximately 30 miles long, from Apple River Falls, Wis., to St. Paul, Minn. The transmission line consists of two 3-wire circuits on one line of poles. The poles are spaced at a maximum distance of 110 feet. The size of wire is No. 2, B & S. medium drawn copper, one circuit being supported on each side of the poles on two cross arms in the form of an equilateral triangle with 24-inch sides. One of these circuits runs straight through without transposition, while the other is spiraled twice at equal intervals.

At each end of the line is located a lightning arrester house. The house at the St. Paul end is within 2 miles of the sub-station and is also used as a cable-terminal house. At each end of the line is a choke coil on each wire and 12 2,000-volt lightning arresters. Each arrester has four air gaps of about ½-inch each, cylinders being 1 x 1¼ inches in series with two graphite resistances, each having a cold resistance approximately of 450 ohms.

From the cable terminal house the current is carried underground through cables at the line voltage to the sub-station. The cables are two in number; one insulated with rubber and the other with prepared paper, both being lead covered, and each of sufficient capacity to carry the entire load. In both cables there are three conductors, each conductor consisting of seven strands of copper wire. At the sub-station in St. Paul there are cable terminals, switching devices and static arresters. The static arresters are lightning arresters, the same as described above, and are connected the same as lightning arresters except that the center of the Y is not grounded.

During electrical storms the line is almost always affected in some way, sometimes very slightly and sometimes shutting the system down entirely. When the storm is severe we usually observe a discharge on one leg of the arresters. The discharge affects the generators at the power house practically the same as does a heavy short circuit and there seems to be a strong tendency for part of the generators to motorize, and always slow down. In some cases they have come practically to a standstill. We have had several cases where the lightning has apparently disregarded the choke coils and the lightning arresters, and damaged the static transformers.

At the sub-station the synchronous converters slow down, but apparently remain in step until the fields become practically dead. This occurs in about 10 seconds. When the generators begin to pick up again at the power house the rotaries also come up with considerable flashing at the brushes. Sometimes they come up with the polarity on part of the rotaries reversed. If they all come up right side up they pick up the load and carry it along as if nothing had happened, but if part of them come up wrong side up it is necessary to shut down and change the polarity.

The alternating current system is not so easily affected as is the direct current system. When the transmission line is affected by lightning discharge and the current comes back in the sub-station, the circuit breakers on the alternating current feeders usually open up, especially on feeders where there are induction motors. This is without doubt due to the fact that the induction motors will take considerably more current to bring them to speed again than is required when they are up to speed; that being practically the only time when all the induction motors on the circuit are started at the same time, these circuit breakers therefore open up, due to a heavy overload.

The effect on the line is entirely dependent upon the severity of the electrical storm. If the electrical disturbance of the atmosphere is light, the lights in the city merely wink. Under these conditions the apparatus does not seem to be affected, but when the electrical disturbances in the atmosphere are very severe it is very difficult to keep the rotary converters in service, due to the fact, as explained above, that when they slow down some of them come up reversed, thus shutting down the whole system; or if they come up right side up, they have to pick up the load at zero, which puts a very heavy overload on them for a short time. This is liable to blow the alternating current fuses and motorize the rotaries.

There is evidence on a great many poles on the transmission line of discharges jumping from the wire to the poles. We have not had poles so badly damaged that they have had to be replaced, but some of them were badly split. At the time of these discharges the insulators on the line were apparently not affected; as a matter of fact, we have had no insulators broken through lightning discharge.

The lightning arresters and static arresters are so adjusted that they discharge constantly, the discharge being very light, being visible only on two or three air gaps next to the line wire. The lightning arresters at one end of the line were very badly damaged during one storm last summer, when the discharge apparently jumped from the line to the ground, arcing across the cylinders without regard to the resistances, forming a straight path to the ground. How long this arc was held we do not know; however, it held long enough to do considerable damage to the cylinders and porcelain.

The trouble where no synchronous apparatus is used is not regarded as so serious, but all the companies that I have been referred to by manufacturers, who are operating synchronous apparatus, state that they have considerable trouble during electrical storms.

By Mr. P. M. LINCOLN, Niagara Falls, N. Y.

The effects of lightning on the Niagara Falls and Buffalo transmission line may, for the purposes of discussion, be divided into two classes: (1) Those lightning discharges which cause destruction of apparatus attached to the transmission line; and (2) those discharges which cause a general short circuit, but without the destruction of any apparatus.

So far as destruction of apparatus is concerned, the Niagara and Buffalo line has been peculiarly fortunate. During the 5½ years of its operation practically the only apparatus that has ever been destroyed by lightning has been lightning arresters. The exception of any importance to this statement was the short circuiting of a 500 k.w. transformer on one occasion at Tonawanda (about half way between Niagara Falls and Buffalo). The only other exceptions consist of one ammeter transformer and a few ground detectors.

In the matter of lightning arresters, however, the line has not been so fortunate. Several different styles and makes have been installed and tried with the result of ultimate disaster to the arrester. Failure has been due to the inability of the arrester to interrupt properly the dynamo current that follows the discharge, and the resulting short circuit at the arrester would usually put it out of business, at least temporarily, and occasionally, permanently. The conditions at Niagara are, of course, unusually severe. The low frequency and the large amount of power involved make it difficult to interrupt a short circuit when once started. Devices that work perfectly on higher frequencies and with less power back of them, have failed utterly on the Niagara and Buffalo line. One of the things which I consider that the experiences of this line have proven is that it is absolutely necessary to limit, by means of resistance, the dynamo current which flows on the discharge of the arrester. No matter what the number of gaps through which the discharge takes place, an arc once started seems to be maintained unless the dynamo current is thus limited.

The device that comes nearest answering our lightning arrester problem is the one now in operation; that is, the so-called "low eqvivalent" lightning arrester of the Westinghouse Electric and Manufacturing Company. In that device the gaps have an ohmic resistance in series with them and another larger resistance to shunt to a portion of the gaps. This arrangement gives the line discharging effect of the small series resistance and the current interrupting effect of the combined series and shunt resistances. In their original form these were put into operation in the summer of 1899, and are still in use in a somewhat modified form. Our former experience, however, has led to the adoption of fuses in the discharge circuit, so that in the case of a short circuit taking place in the arresters, both line and arresters are protected; the line from a continuation of the short circuit, and the arresters from the damage that would necessarily follow that continuation. In all our lightning arresters choke coils are put in the line and the discharge circuits tapped on the line side of the choke coils.

In the invitation to present these notes the question is asked: "How frequently are your lines affected by lightning that your devices have failed to arrest?" Those occasions when the arrester conducts off the flash, but becomes short circuited, can hardly be called failures to arrest. It is possible—and perhaps even probable—that other apparatus might

have been destroyed had not the flash been taken care of by the arrester. In most of the failures to arrest, as observed on the Niagara and Buffalo line, the lightning has caused short circuits somewhere along the overhead line, sometimes with a simultaneous discharge across the gaps of the arrester and sometimes with no sign of such discharge. Our observations would indicate that the voltage necessary to jump over a wet insulator does not differ greatly from that required to jump across the gaps of the lightning arrester. In case such a short circuit is once established anywhere along the line, it almost always continues until the current is pulled off the lines, in spite of the fact that the distance between our conductors is 36 inches. Most of our lightning interruptions are of this nature. No permanent damage is done. All that is necessary is to take off the current for an instant; supply of power can be resumed immediately.

An examination of the records for the past three summers—those of 1899, 1900 and 1901—shows that during that time 18 interruptions occurred due to lightning, 5 of which occurred within a space of about 3 hours, during a storm of unprecedented severity. The average duration of the interruptions has been about 4 minutes. Considering the prevalence of lightning on the Niagara frontier, I consider this record a very good one.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

THE United Gas and Electric Company, of this city, has acquired the plant and franchises of the Altoona (Pa.) Gas Company.

MESSRS. ANDREW J. MACKAY, Eugene A. Austin, J. B. Teagarden, Peter English and Frank English have incorporated the Boulder Gas Company. The Company is capitalized in $200,000. The named place is the capital seat of Boulder county, Col., and is located on Boulder creek, at a point 30 miles by rail northwest of Denver. It is on a branch of the Union Pacific Railroad system, and lies in a fertile plain close to the east base of the Rocky Mountain range. It is a thriving place, and has a permanent population of not less than 6,500.

AT the annual meeting of of the Gas Light Company of the City of New Brunswick, N. J., the following officers were elected: Directors, W. P. Voorhees, Nathaniel King, Bernard J. Katz, R. W. Johnson, John C. Eisele, J. B. Kirkpatrick and Halsey M. Barrett; President, J. B. Kirkpatrick; Treasurer, John C. Eisele; Secretary, Halsey M. Barrett. Mr. Samuel C. Gowen was reappointed Superintendent.

THE Buffalo (N. Y.) Gas Company has agreed to abolish meter rentals, and the city has renewed its contract with the Company on public lighting account for a term of 5 years.

AT the annual meeting of the Bordentown (N. J.) Gas Light Company the Directors elected were: John P. Hutchinson, J. Holmes Longstreet, John L. Kuser, R. H. Aaronson and John H. Hutchinson.

MR. A. VAN DERWERKEN has sold the Goshen (N.Y.) gas works, which property was operated by him personally for several years, to the Goshen Gas and Fuel Company. Mr. S. J. Franklin, who has been elected Secretary and Treasurer of the overtaking concern, is the active business man of the Company, and Frank Melio will continue as Superintendent. The generating plant is to be rebuilt and a fair line of main extension has been agreed upon. The rate for fuel gas has been reduced to $1.50 per 1,000 cubic feet.

MR. J. W. TELFORD, who represents the Chicago Building and Manufacturing Company, avers that the concern means business of the speedy sort in connection with the proposed construction of a gas plant at Pontiac, Ills.

THE Baltimore *Sun* of the 13th inst. had this to say: "No action relative to filling the two vacancies in the Board was taken by the Directors of the Consolidated Gas Company at the monthly meeting. President F. C. Latrobe in his report said he had called the attention of the Board to the vacancies, but it was decided not to fill them for the present owing to the close proximity of the annual election. The yearly meeting will be held on July 21. It was thought that the Board would nominate a ticket, though that may be done at the monthly meeting, July 10. The syndicate of stockholders that is having an examination made of the Company's affairs wants representation on the Board, and unless this is assured will probably make a contest at the election. It is said the syndicate controls 35,000 of the 110,000 shares of stock. The Board decided not to appeal from the decision of Judge Dennis, requiring the Company to pay taxes on stock held by non-residents. The taxes amount to $36,138. The other business transacted, Mr. Latrobe said, was entirely routine."

MR. C. W. BRYAN has been appointed Manager of the Contracting Department, American Bridge Company, vice the late Mr. Frank Conger. Mr. Bryan's headquarters are at 100 Broadway, New York city.

"F. R. M." is informed that the annual meeting of the East Newark (N. J.) Gas Light Company will be held at No. 575 Broad street, Newark, to-morrow noon.

AT the annual meeting of ths Vallejo (Cal.) Gas Light Company the following executive management was chosen: President, F. W. Hall; Vice-President, R. J. R. Aden; Secretary, G. W. Wilson.

MR. W. S. P. SHIELDS, of Philadelphia, who is the leading spirit in the Company recently organized to supply gas and electric lights to the residents of Hampton and Phoebus, Va., says that, although the franchise grants him 18 months within which to complete the plant, he will have the same in operation well within a year.

MR. L. T. RANSOM is informed that the construction and electric supply department, heretofore operated by the Utica (N. Y.) Gas and Electric Company, has been purchased and will hereafter be operated by the Johnson and Morton Company, of Utica. The headquarters of the Company for the present are at 86 Lafayette street.

THE Directors of the Pawtucket (R. I.) Gas Company have named the following executive management: President, Lyman M. Darling; Treasurer, Charles L. Haight; Secretary, Frederick W. Easton; Superintendent, William McGregor.

WRITE to the Humphrey Manufacturing and Plating Company, of Kalamazoo, Mich., for a copy of its new and handsome catalogue, which carries on its cover the titling, "The Luxury of a Bath." The book is mainly devoted to fully illustrated descriptions of the Company's line of "Crescent Instantaneous Meter Heaters," and the get-up of the catalogue, which is due to the ingenuity and taste of the Company's Manager, Mr. H. S. Humphrey, is most attractive.

GENERAL MANAGER FROST says that the new gas plant for Delray, Mich., will be in practical operation by the 18th prox.

AT the annual meeting of the Altoona (Pa.) Gas Company the following officers were elected: Directors, John Lloyd, R. S. Storrs, S. R. Bertron, E. E. Witherby, W. H. Taylor, B. M. Bunker and W. C. Lut; President, John Lloyd; First Vice-President, R. S. Storrs; Treasurer and Assistant Secretary, Murray W. Dodge; Secretary and Assistant Treasurer, W. C. Gerst.

A CORRESPONDENT in Omaha, Neb., forwards the following: "Some days ago John Donohue, custodian of the Omaha city jail, discovered that the city had been furnishing gas to a small gas stove used by D. R. Cameron, who has the contract for feeding the city prisoners. Cameron is allowed the use of a kitchen in the jail basement, and it is understood that he was to be supplied with hot water for cooking. Recently the boiler in the jail had to be repaired and the supply of hot water was cut off. Cameron thereupon attached a pipe to the city's gas service, connecting the same to a gas stove with which he heated the water. When the attention of Mayor Moores was called to the matter he ordered the Cameron connection cut off. Cameron, and with seeming justice as to the stand taken by him, declares he will sue the city, averring that, as the city did not live up to its contract to furnish him with hot water, he was quite within his right to use the gas."

MESSRS. FARSON, LEACH & COMPANY, of Chicago, in "financing" their recent purchase of the Evansville (Ind.) Gas and Lighting Company, are offering for sale $950,000 worth of bonds out of an authorized total issue of $1,250,000. The Company is capitalized in $600,000.

THE affairs of the Adrian (Mich.) Gas Company, now under the capable ownership and direction of the Messrs. Lloyd, of Detroit, Mich., are prospering greatly.

We regret very much to have to chronicle the death of Mr. John Carroll, who since 1862 had superintended the gas manufacturing division of the properties of the Scranton (Pa.) Gas and Water Company. His death occurred at his residence, 422 Madison street, Scranton, the evening of June 11th. He was in his 66th year, and is survived by a son and four daughters.

The application made to the authorities of Waterford, N. Y., by Messrs. C. L. Mitchell and A. J. Griffin, for the right to there construct and maintain works for the supply of gas for light, heat and power uses, has been denied.

"W. S.," writing from East St. Louis, Ills., under date of the 14th inst., says: "Confirming your recent brief note to the effect that the plant of the East St. Louis Gas Company had changed hands, I may add thereto that the nominal purchaser was the East St. Louis Trust Company, which acted for an Eastern syndicate. The overtaking Company will be organized under the laws of Illinois. The price of gas will be $1.25 per 1,000, and the works are to be rebuilt."

Press advices by way of Pittsburg, Pa , are to the following effect: "A war between the gas companies at McKeesport, Pa., has been declared and consumers for both light and fuel will reap the benefit. The Philadelphia Company has had control of the gas for fuel for 2 years. Recently the price was raised to 25 cents a 1,000. Some days ago the McKeesport Gas and Improvement Company announced at McKeesport that on and after July 1 the Company would be prepared to furnish consumers with gas for either light or fuel at 20 cents per 1,000. The McKeesport Gas and Improvement Company, which secures its supply of gas from the Pittsburg gas and coke plant at Glassport, is owned by Eastern capitalists. The Company controls the lines of the former McKeesport Illuminating Gas Company on many streets in McKeesport, and will ask Councils for right of way for more pipe."

It is understood that the General Council of Louisville, Ky., has determined to appoint Messrs. W. J. Abram, Roland Whitney, George Gaulbert and Arthur Ruttledge as the representatives of the city on the Board of Directors of the Louisville Gas Company. The city's ownership in the stock of the Company amounts to $925,000 at par.

Mr. A. S. Bacon, of New Haven, Conn., sends the following, under date of the 13th inst.: "Mr. Jas. H. Eddy, President New Britain (Conn.) Gas Company, died at his home, 14 Pearl street, shortly before midnight last night. Mr. Eddy's health has been steadily failing for a year past and his death was not unexpected. Mr. Eddy has been in the habit for years past of spending his winters in Florida. He was taken with a severe attack of pneumonia while at his usual resort the past winter, and although he weathered it, he was left in a condition of great physical frailty. When he returned north he was accompanied by a physician. Mr. Eddy had been seen on the street but a few times since returning north, and it was apparent that he made a brave attempt to bear himself with his wonted erectness. He has been attended constantly by Dr. Swasey, of New Britain, and Dr. Shepard of Hartford. The former was with him when he died. Mr. Eddy was 64 years of age. He is survived by a wife, a son, Attorney Charles Eddy, of New York, a daughter, Miss Elizabeth Eddy, and 2 brothers, Elford B., of New Britain, and N. B., who is a broker, a resident in California. Mr. Eddy was born in New Britain. He was a son of Harlow Eddy, and the homestead was in Black Rock. He attended the local schools, but did not complete the course in the High School, preferring to enter at once into the career of manufacturing, which he followed the remainder of his life. He took an humble position with the Stanley Rule and Level Company, working himself up the various grades of the factory until he became the most important contractor in the concern and a member of the Board of Directors. He was the contractor in charge of the rule room. Mr. Eddy was probably with the rule shop for 45 years and for 30 years held the contractorship aforementioned. Mr. Eddy was elected President of the New Britain Gas Company upon the death of Mr. George M. Landers in 1895. He was a heavy stockholder in that corporation. Mr. Eddy was a Director in the Union works, but he gave this up, with his active interests in the rule shop, when his health began to worry him a few years ago. He has represented his ward in the Common Council and he was active on the Board of Managers of the New Britain Institute Library. Prof. Camp, in speaking of his connection with the Library, to-day, said that he found him at all times very sympathetic towards the promulgation of the work of that institution. Mr. Eddy was a careful financier and he amassed a generous competence for his family. His money is almost wholly invested in New Britain concerns and the city has had the benefit of it. He was prominent in the Center Church and was active at all its meetings."

How an Electric Light Station is Run.

Electricity, in a recent editorial anent the caption, remarks: As a general rule electric lighting stations in this country look carefully after their customers, as it is to their interest to do so. If anything goes wrong an earnest endeavor is made to remedy the fault at once, for if it is allowed to remain the chances are that the customer will some day get out of patience and go back to gas, or even lamps. No progressive and enterprising electric lighting station likes or can afford to lose customers in this way, consequently an earnest effort is usually made to keep the lights up to the requisite candle power, and all parts of the system in good working order. This is as it should be, with the result that such a plant is constantly gaining custom. Not a million miles from New York city, nor more than a thousand miles from Hackensack, N. J., there is an electric light company that does things in a different way, principally because throughout the territory which it supplies there is no competition of any sort to be met with. As a consequence, when anything goes wrong, the officials in charge take their own time in repairing it. For example: Some time ago a converter which supplied current to a couple of dwellings in the vicinity was slightly damaged during a thunder storm. The company was notified by telephone within an hour of the occurrence, and promised to have the matter looked after at once. This was not done, and in spite of repeated protests the houses in the vicinity were without electric lights for 3 days and 3 nights, it apparently being a matter of absolute indifference to the company whether the people in the houses in question went to bed in the dark or by the light of tallow candles.

Another interesting fact connected with this company. When the lamps are lit they give instead of sixteen candle power about ten, until it is time to retire for the night, when they suddenly flare up, presumably owing to the load having been reduced, or to another generator set being started Again, without the slightest warning, the lights will grow dimmer and dimmer, and finally go out entirely, and remain out half an hour or an hour or possibly all night.

It might be supposed that when such an event occurred the officials would send out postal cards making some explanation to their customers, but that apparently never enters their minds; the only thing they never forgot to send out being bills.

This company is a member of the National Electric Light Association, and such being the case it would do well to send a capable representative to attend the convention and "listen" to what such men as Messrs. Doherty, Ferguson and others have to say in regard to how a lighting station should be run. We say "listen" because we do not think a representative of that company would be qualified to make any remarks on the subject worth hearing.

French Prize Competition for Belt Mounters.

According to the *Scientific American*, the numerous accidents to workmen in establishments where belts are used has recently brought about the stringent application of a French law, forbidding the removing or replacing of a strap by hand while the machinery is in motion.

In order to obviate the waste of time consequent upon the stopping of the machinery, an association of French manufacturers has announced an open international competition for the best fixed belt mounter.

The invention should be designed for simple and not for conical pulleys, and must comply with the following conditions:

1. It must be simple, strong, and occupy little space; easy to fix and use.
2. Not dangerous in working.
3. Convenient for any speed, width, or position of belt.
4. Able to throw the belt off or on.
5. Sufficiently low in price to allow of its wide use.

Competitors are invited to send a full description of their invention, accompanied, if possible, by a model or at least by satisfactory illustrations, to the President de l'Association des Industries de France contre les Accidents du Travail, No. 3 rue Lutece, Paris, prior to October 1, 1902.

This notice may be of interest to American inventors or to firms dealing in machinery of this character.

THE AMERICAN GAS LIGHT JOURNAL

A. M. CALLENDER & CO.,
PROPRIETORS.

THOS. J. CUNNINGHAM,
ELBERT P. CALLENDER,
EDITORS.

CHAS. E. SANDERSON,
MANAGER.

PUBLISHED ON EACH MONDAY OF THE YEAR AT
No. 42 Pine Street, New York.
Telephone, 2996 John.

TERMS:
SUBSCRIPTION—Three Dollars per annum, in advance. Single copies, 10 Cents.

The JOURNAL is the official organ of the
NEW ENGLAND ASSOCIATION OF GAS ENGINEERS.
AMERICAN GAS LIGHT ASSOCIATION.
WESTERN GAS ASSOCIATION.
OHIO GAS LIGHT ASSOCIATION.
PACIFIC COAST GAS ASSOCIATION

Notification Respecting Advertising.—Orders for new advertising, or for changes in standing advertisements, to insure attention in the issue following their reception, must be in hand any time of Wednesday.

AGENTS:
New York—American News Co. 39 and 41 Chambers St.
Germany—Lemcke & Buechner, of New York.
England—Aug. Siegle, 30 Lime Street, London.

MONDAY, JUNE 23, 1902.

The Market for Gas Securities.

Weakness was the dominant factor in the trading in local gas shares for the week. Consolidated often made its appearance on the tape, and although the margin of difference as between the figures of last week and the preceding one was small, it is nevertheless the fact that the transactions for the former were all accomplished at an average decline over the latter. There is nothing in sight that accounts for the weakness, so it must be put to apathy. The closing figures to-day (Friday) were 220½ to 221.

Brooklyn Union sold down to 233, and closed at 234 to 238. The transactions in this stock were of greater frequency than usual. Washington (D. C.) gas is again climbing upward, the current quotation for it being 370 to 375. Consolidated, of Baltimore, scored a sharp advance. Notice has been given by certain strong new interests in the Company that the vote for Directors, which occurs on the 21st prox., will be canvassed, such notification meaning that all proxies will have to be attested before a notary public. President Latrobe seems to have the confidence of both factions. Peoples, of Chicago, shows no change. The plan for reorganization of the New England Gas and Coke Company is a peculiarly severe measure. The projected terms thereof have been published at length in the daily papers. The scheme is directly under the planning of Messrs. Kidder, Peabody & Company.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

16 WALL STREET, NEW YORK CITY.

JUNE 23.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share.

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked.*
Consolidated	$78,177,000	100	220¾	221
Central Union, Bonds, 5's.	3,000,000	1,000	109	110
Equitable Bonds, 6's	1,000,000	1,000	105	
" 1st Con. 5's	2,300,000	1,000	118	120
Metropolitan Bonds	658,000	..	108	112
Mutual	3,500,000	100	350	..
Municipal Bonds	750,000	..	..	..
New Amsterdam Gas Co. ..				
Bonds, 5's	11,000,000	1,000	111½	..
Northern Union, Bonds, 5's.	1,250,000	1,000	106	108
New York and East River..				
Bonds 1st 5's	3,500,000	1,000	112	113
" 1st Con. 5's	1,500,000	..	109	111
Richmond Co., S. I.	348,650	50	100	..
" Bonds	100,000	1,000	103	
Standard	5,000,000	100	130	140
Preferred	5,000,000	100	150	160
Bonds, 1st Mortgage, 5's	1,500,000	1,000	114	117
Yonkers	299,650	500	130	
Out-of-Town Companies.				
Brooklyn Union	15,000,000	100	234	238
" " Bonds (5's)	15 000,000	1,000	119	119½
Bay State	50,000,000	50	1⅝	1¾
" Income Bonds	2,000,000	1,000	.	75
Binghamton Gas Works...	450,000	100	28	30
" 1st Mtg. 5's	509,000	1,000	93	96
Boston United Gas Co.—				
1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	13	13¼
" " Bonds, 5's	5,250,000	1,000	83½	84½
Capital, Sacramento	500,000	50	..	35
Bonds (6's)	150,000	1,000	.	
Central San Francisco	2,000,000	..	106	108
Chicago Gas Co. Guaranteed Gold Bonds	7,650,000	1,000	104	104¼
Cincinnati Gas & Elec. Co.	29,500,000	100	103¾	103⅞
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	108	109
Columbus (O.) Gas Lt. & Heating Co	1,682,750	100	88¼	89¼
Preferred	3,026,500	100	106¼	107¼
Consumers, Jersey City Bonds	600,000	1,000	102	103
Consumers, Toronto	1,700,000	50	218	225
Consolidated, Baltimore...	11,000,000	100	69⅜	69½
Mortgage, 6's	3,600,000	..	..	118
Chesapeake, 1st 6's.	1,000,000	..	..	..
Equitable, 1st 6's.	910,000	..	..	..
Consolidated, 1st 5's	1,490 000	..	.	112
Consolidated Gas Co. of N.J.	1,000,000	100	14	17
" Con. Mtg. 5's	380,000	1,000	85	87
Consolidated G. & E. Co.'s., Little Falls, N.Y.	90,000	100	..	100
Bonds	75,000	..	..	100
Detroit City Gas Co	4,825,500	50	.	89
" Prior Lien 5's	5,603,000	1,000	99½	100
Detroit Gas Co., 5's	852,000	1,000	77	79
" Inc. 5's	16,000	100	94	94½
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	..	101
Essex and Hudson Gas Co.	6,500,000	..	34	38
Fort Wayne	2,000,000	..	.	.
" Bonds	2,000,000	..	58	63
Grand Rapids Gas Lt. Co. 1st Mtg. 5's	1,225,000	1,000	104½	105
Hartford	750,000	25	245	265
Hudson County Gas Co., of New Jersey	10,500,000	..	25	..
" Bonds, 5's	10,500,000	..	101	103
Indianapolis	2,000,000	..	75	80
" Bonds, 6's	2 650,000	..	102	104
Jackson Gas Co.	250,000	50	73	75
" 1st Mtg. 5's	290,000	1,000	101	102½
Kansas City Gas Light Co., of Missouri	5,000,000	100	..	36
Bonds, 1st 5's	3,822,000	1,000	102	104
Laclede, St. Louis	10,000,000	100	..	89
Preferred	2,500,000	100	..	110
Bonds	10,000,000	1,000	109½	110
Lafayette Gas Co., Ind.	1,000,000	100		60
Bonds	1,000,000	1,000	58	64
Louisville	2,570,000	50	110	120
Madison Gas & Elec. Co.				
" 1st Mtg. 6's	350,000	1,000	107½	109½
" 6 per cent. scrip, due 1910	100,000	25	25	87
Montreal, Canada	2,000,000	100	182	184¾
Newark, N. J., Con. Gas Co	6,000,000	..	56	58
Bonds, 6's	4,600,000	..	105	105¾
New Haven	1,000,000	25	300	325
Nashville Gas Lt. Co.	1,000,000	100	110	..
Oakland, Cal.	2,000,000	..	46	47
" Bonds	750,000	..	..	..
Peoples G. L. & Coke Co., of Chicago	25,000,000	100	102	102½
Peoples Gas Lt. & Coke Co., Chicago, 1st Mortgage	20,100,000	1,000	..	..
2d "	2,500,000	1,000	104	
Rochester Gas & Elec. Co..	2,150,000	50	88	..
Preferred	2,150,000	50	118	..
Consolidated 5's	2,000,000	..	87½	90
San Francisco, Cal.	10,000,000	100	48	48½
St. Paul Gas Light Co.	1,500,000	100	45	47
1st Mortgage 6's	650,000	1,000	113	116
Extension, 6's	600,000	1,000	112½	115
General Mortgage, 5's..	2,465,000	1,000	92	93
St. Joseph Gas Co.				
" 1st Mtg. 5's	751,000	1,000	95	97½
Syracuse, N. Y.	1,750,000	100	15	17
Bonds	1,612,000	1,000	95½	97½
Washington, D. C	2,600,000	20	370	375
First mortgage 6's	600,000	..	..	..
Western, Milwaukee.				
Bonds, 5's	4,000,000	.	109½	110
Wilmington, Del.	600,000	50	232	

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(*Continued on page* 930.)

DIVIDEND NOTICE.

OFFICE OF THE UNITED GAS IMPROVEMENT CO.,
N. W. CORNER BROAD AND ARCH STS.,
PHILADELPHIA, PA., June 11, 1902.

The Directors have this day declared a quarterly dividend of 2 per cent. (one dollar per share), payable July 15th, 1902, to stockholders of record at the close of business, June 30, 1902. Checks will be mailed.

1410-3 LEWIS LILLIE, Treasurer.

WANTED,

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1410-2 Address, "C. C. C.," Care this Journal.

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1409-4

WANTED.

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By a man 40 years of age. Over 20 years' experience as superintendent of both coal and water gas plants; also in construction and extensions. Fully understands all about manufacture and distribution and office duties.

1411-1 Address, "G.—150," care this Journal.

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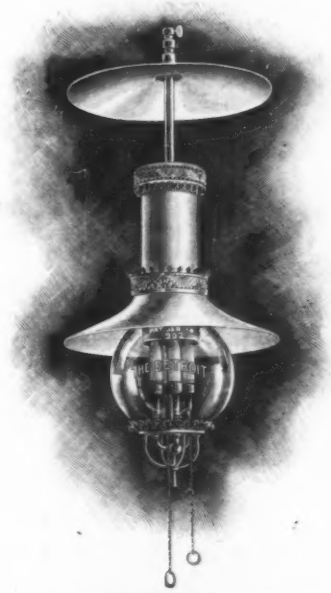

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Simplicity,
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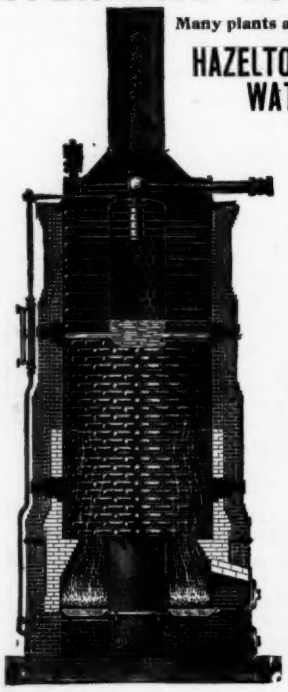

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THE NOVELTY STEAM BOILER WORKS,

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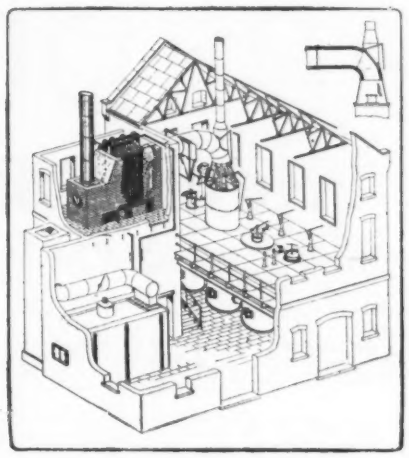

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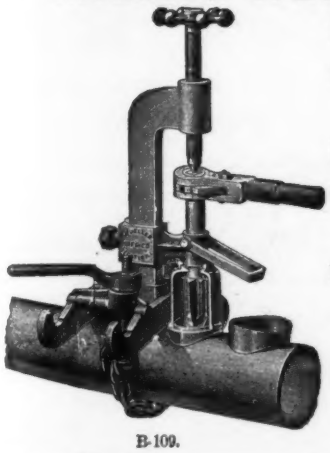

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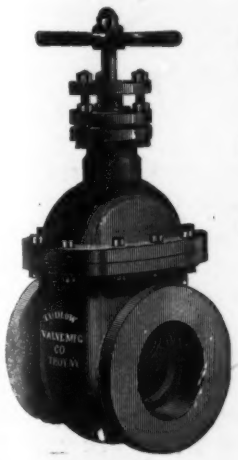

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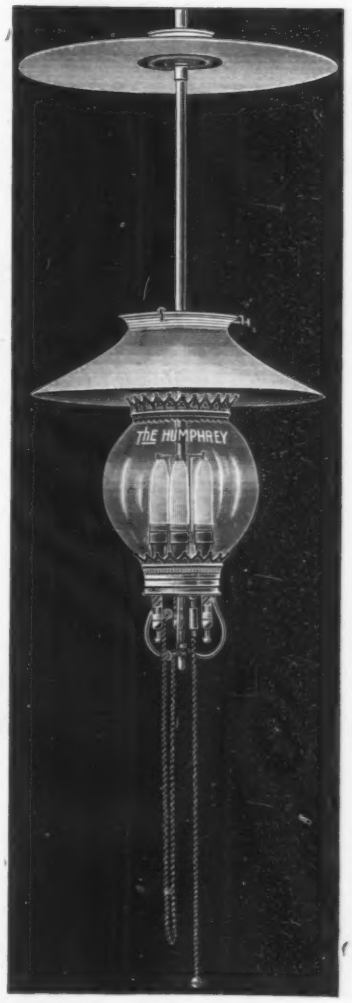

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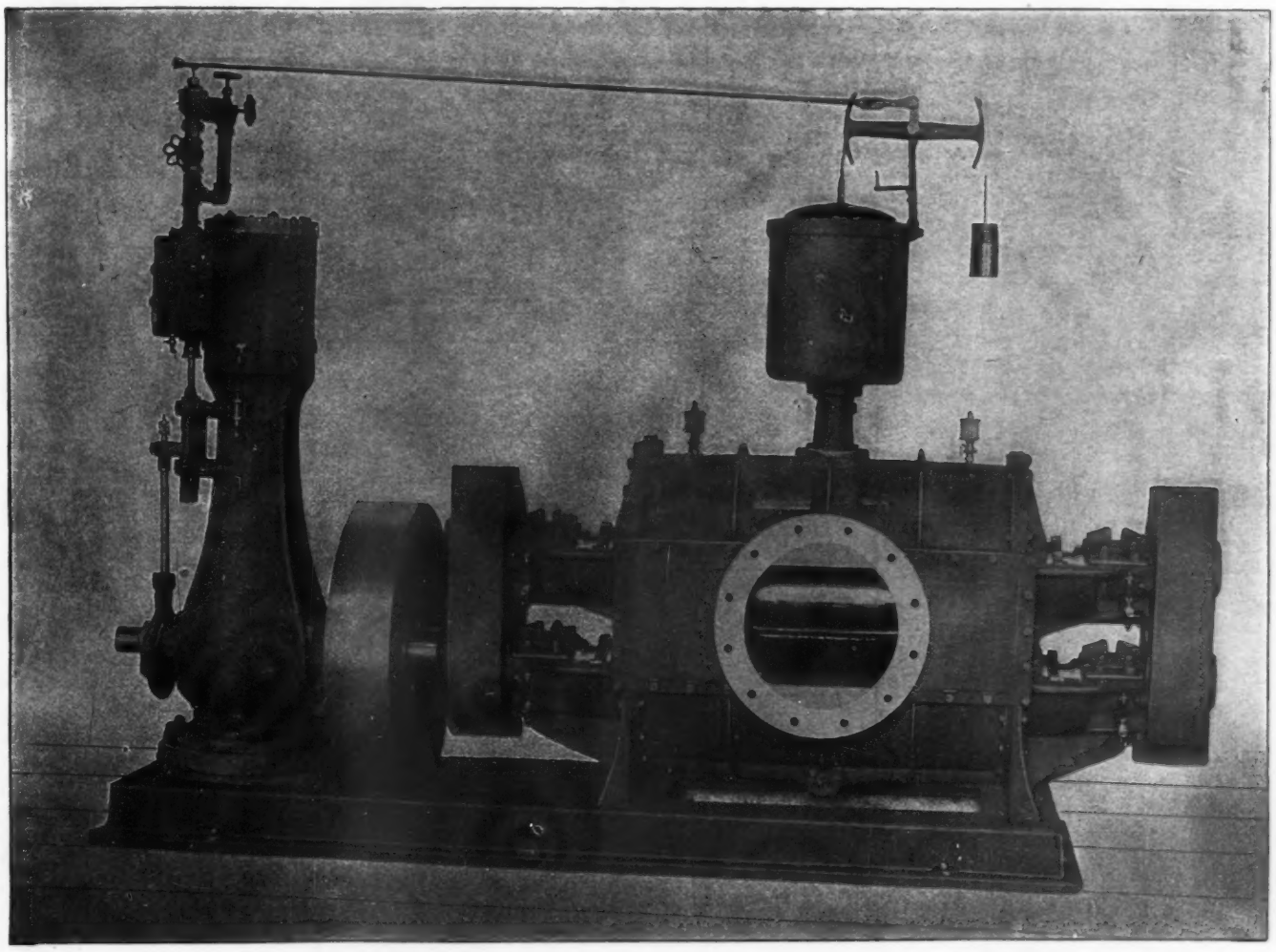

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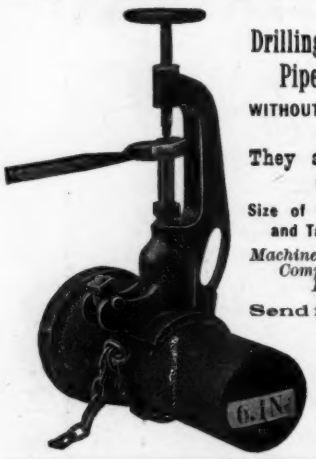

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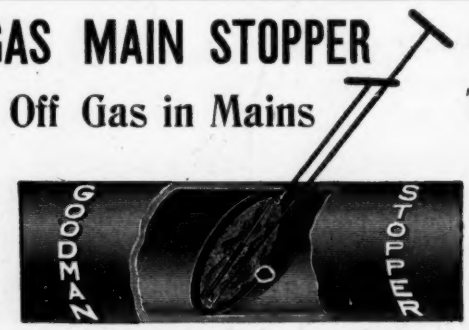

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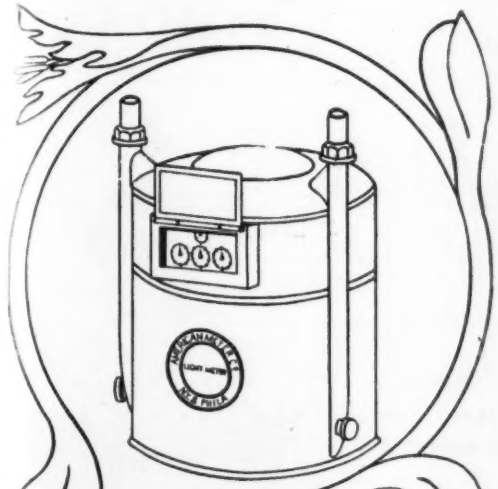

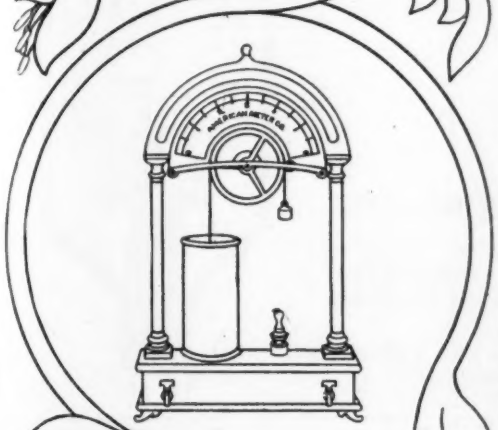

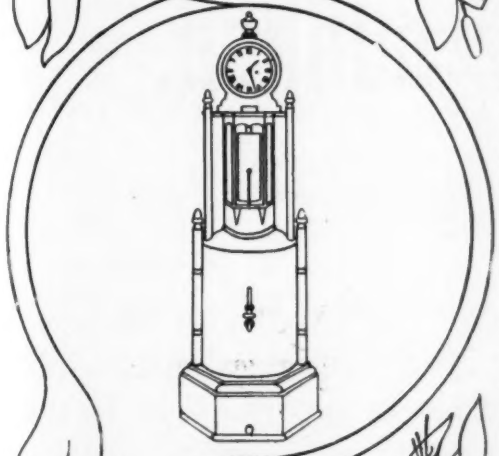

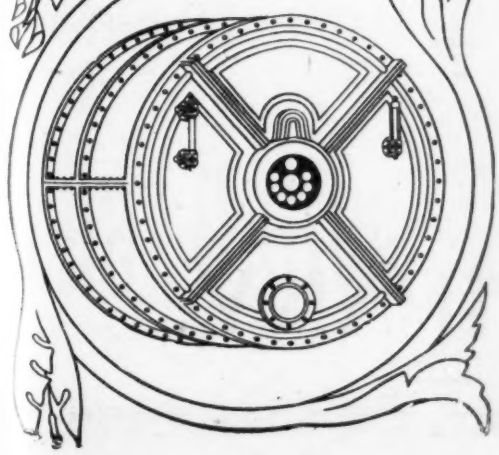

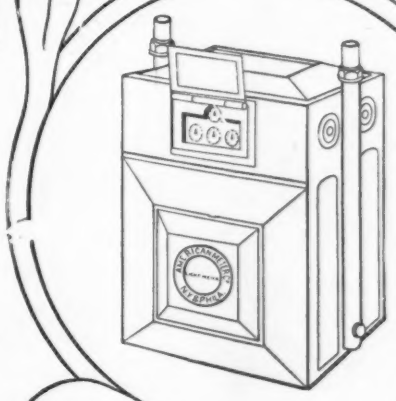

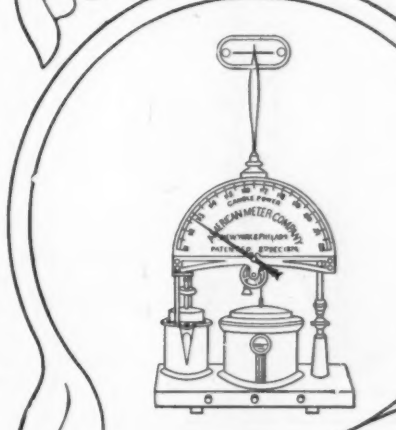

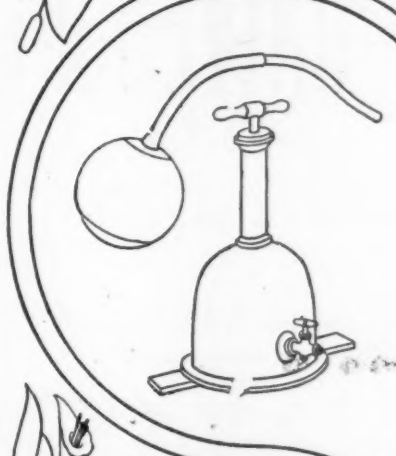

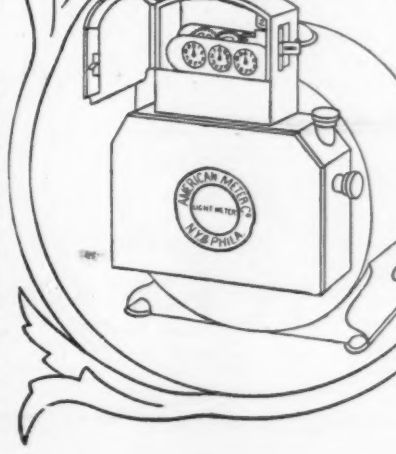

PUBLIC LIGHTING TABLE.

JULY, 1902.

Day of Week.	Table No. 1. FOLLOWING THE MOON. Date.	Light.	Extinguish.	Table No. 2. NEW YORK CITY. ALL NIGHT LIGHTING. Light.	Extinguish.
				P.M.	A.M.
Tue.	1	8.00 PM	2.50 AM	7.30	3.15
Wed.	2	8.00	3.40	7.30	3.15
Thu.	3	8.00	3.40	7.30	3.15
Fri.	4	8.00	3.40	7.30	3.15
Sat.	5	8.00 NM	3.40	7.30	3.15
Sun.	6	8.00	3.40	7.30	3.15
Mon.	7	8.00	3.40	7.30	3.15
Tue.	8	8.00	3.40	7.30	3.15
Wed.	9	8 00	3.40	7.30	3.15
Thu.	10	9.40	3.40	7.30	3.15
Fri.	11	10.10	3.40	7.30	3.15
Sat.	12	10.40 FQ	3.40	7.30	3.15
Sun.	13	11.20	3.40	7.30	3.15
Mon.	14	11.50	3.40	7.30	3.15
Tue.	15	12.30 AM	3.40	7 30	3.15
Wed.	16	1.20	3.40	7.20	3.15
Thu.	17	2.00	3.40	7.20	3.15
Fri.	18	3.00	3.40	7.20	3 15
Sat.	19	No L.	No L.	7.20	3.15
Sun.	20	No L. FM	No L.	7.20	3.15
Mon.	21	No L.	No L.	7.20	3.15
Tue.	22	7.50 PM	9.20 PM	7.20	3.15
Wed.	23	7.50	9.50	7.20	3.15
Thu.	24	7.50	10.20	7.20	3.15
Fri.	25	7.50	10.50	7.20	3.15
Sat.	26	7.50	11.20	7.20	3.15
Sun.	27	7.50 LQ	12.00	7.20	3.15
Mon.	28	7.50	12.40 AM	7.20	3.15
Tue.	29	7.50	1.30	7.20	3.15
Wed.	30	7.50	2.30	7.10	3.30
Thu.	31	7.50	4.00	7.10	3.30

TOTAL HOURS LIGHTING DURING 1902.

By Table No. 1.	Hrs. Min.	By Table No. 2.	Hrs. Min.
January	238.30	January	423.20
February	196.20	February	355.25
March	196.20	March	355.35
April	166.40	April	298.50
May	151.40	May	264.50
June	131.10	June	234.25
July	142.40	July	243.45
August	162.00	August	280.25
September	179.00	September	321.15
October	216.30	October	374.30
November	224.10	November	401.40
December	250.00	December	433.45
Total, yr.	2255.00	Total, yr.	3987.45

NEW YORK, 33 Nassau Street. PHILADELPHIA, Broad and Arch Streets. CHICAGO, Foot of Orleans Street. BOSTON, 624 Tremont Building.
CLEVELAND, 809 Cuyahoga Building. ST. LOUIS, 712 Roe Building. SAN FRANCISCO, 712 Polk Street.

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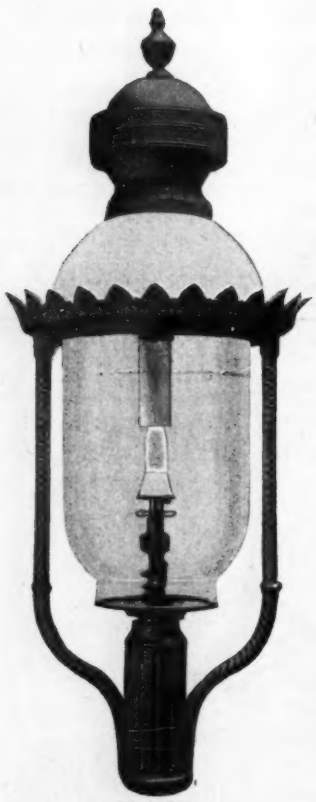
.... OF AMERICA ....



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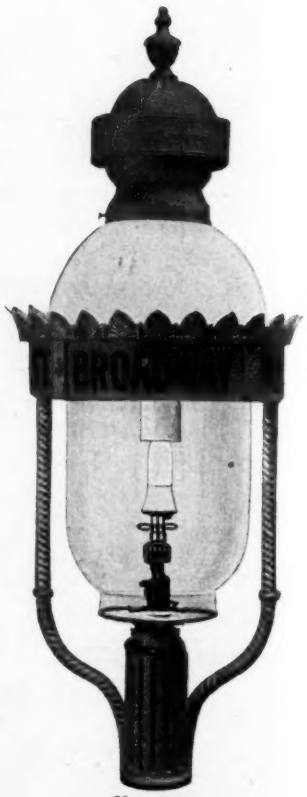

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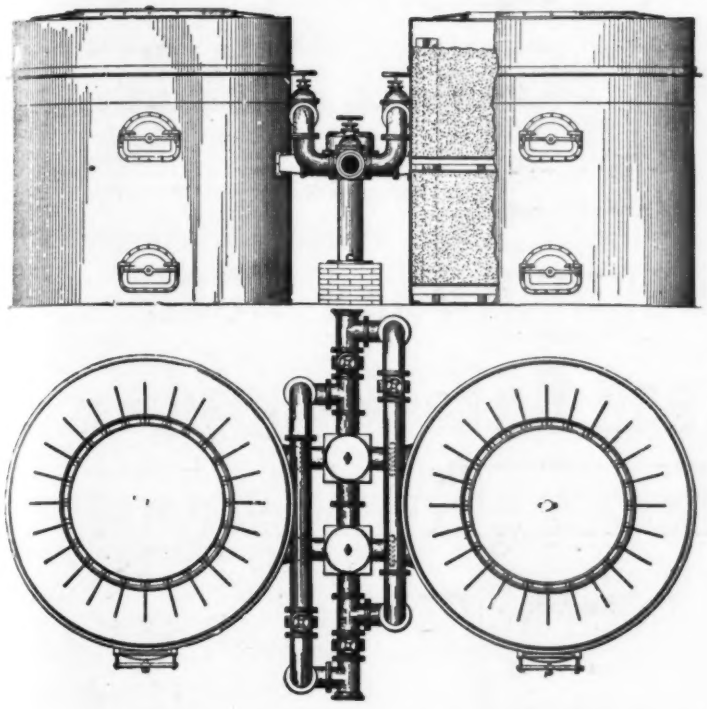

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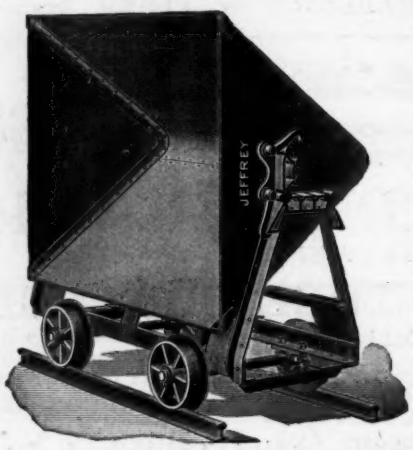

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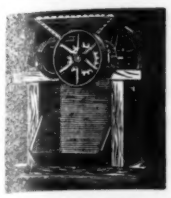

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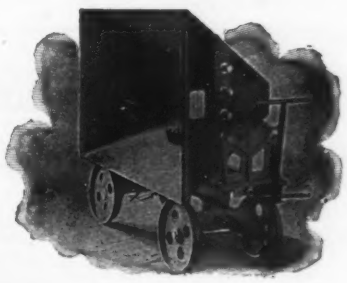

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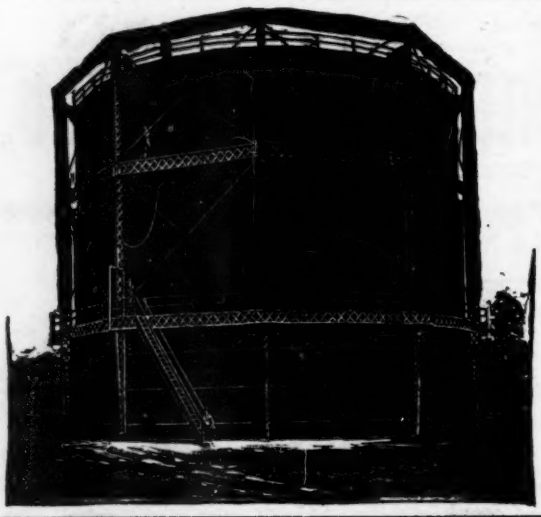

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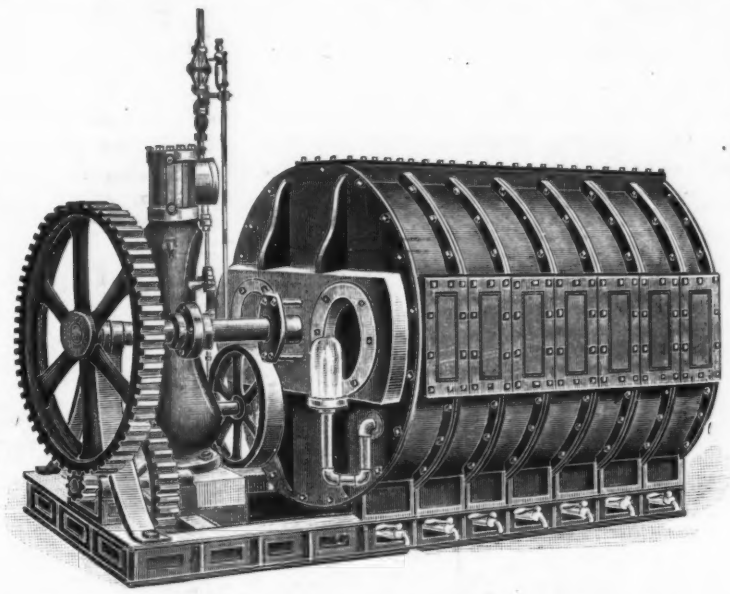

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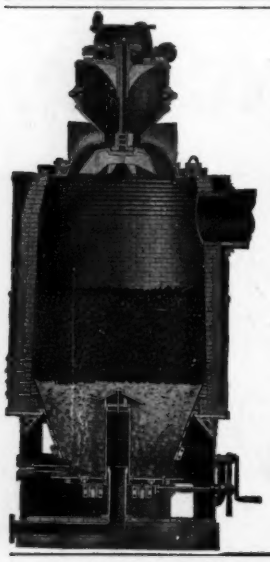

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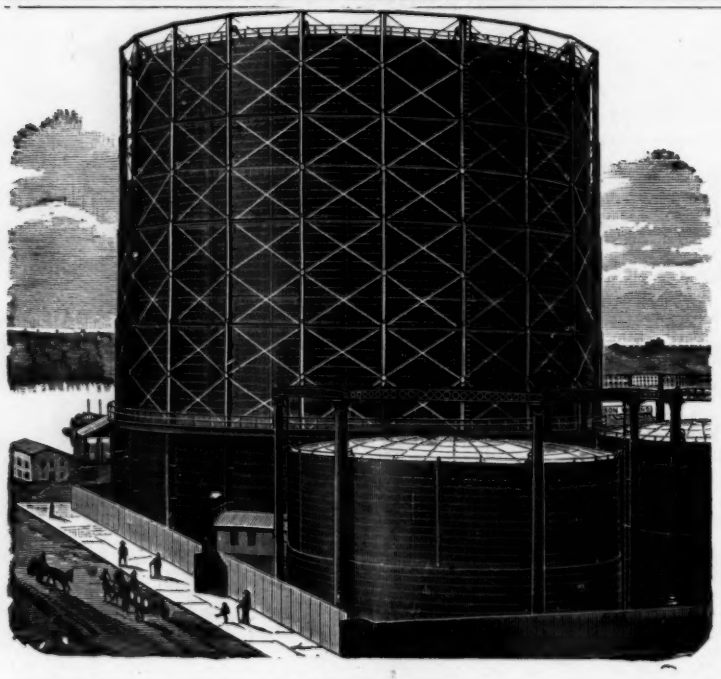

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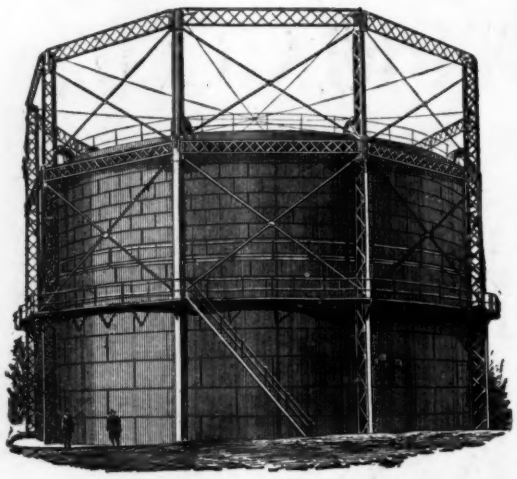

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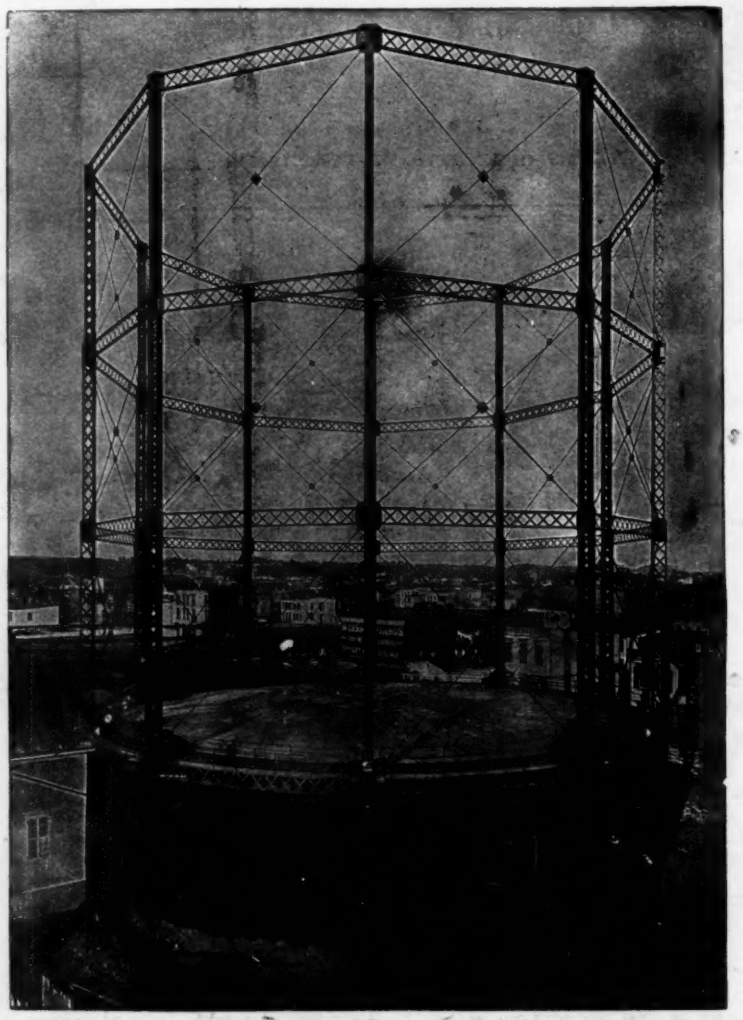

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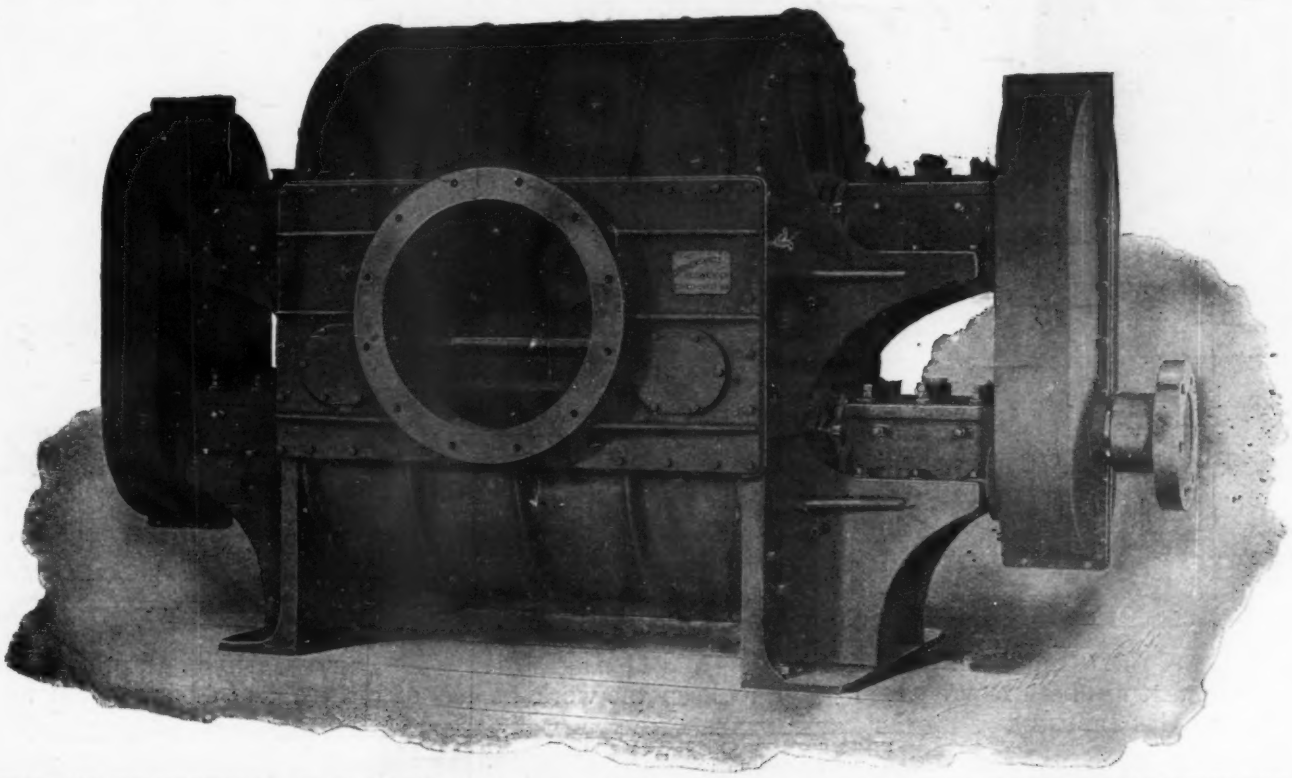

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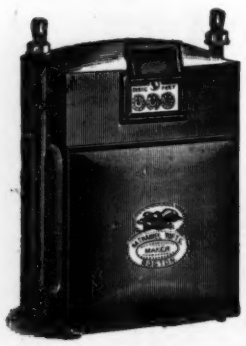

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